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BULLETIN OF THE RAFFLES MUSEUM No. 1—4

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OF THE
RAFFLES MUSEUM
Singapore, Straits Settlements

No. 1. September, 1928

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Spolia Mentawiensia: Blattidae. By R. Hanitsch, Ph.D., with an Introduction by C. Boden Kloss (Plates I—II)

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Note

Hitherto the Raffles Museum has had no publication of its own, and until recent years the want of one was perhaps not felt. But of late the output of papers prepared by the staff and by others on its collections has increased considerably: and although the Museum has been able gratefully to avail itself of the hospitality offered by a number of Societies and Institutions which have placed space in their publications at its disposal, yet welcome as this hospitality—which is one that it is hoped still to make use of occasionally—has been, it nevertheless suffered from two drawbacks. The one was a lack of promptness in publication; the other drawback was that the Raffles Museum was without a means to make some return to the numerous Museums, Institutions and Societies which present it with their publications. Therefore, loth as I am to add one more to the many biological journals current, the "Bulletin of the Raffles Museum" now comes into existence.

The Bulletin will be published as material is available; each number will be complete in itself and will have its own pagination but it is intended whenever sufficient numbers to form a volume of reasonable size have been produced to issue a title-page, table of contents and index.

A list of the papers dealing with the collections of the Museum and others published by the staff during the last five years will be given in Bulletin No. 2. It is appropriate that the first paper in this new journal should be by Dr. R. Hanitsch who retired in 1919 from the Directorship of the Raffles Museum of which he had been in charge since 1894.

C. BODEN KLOSS,
Director of Museums,
Straits Settlements and
Federated Malay States

RAFFLES MUSEUM,
SINGAPORE,
STRAITS SETTLEMENTS,
September 1928.

Spolia Mentawiensia: Blattidæ. By **R. Hanitsch,** Ph. D., formerly Director, Raffles Museum, Straits Settlements. With an Introduction by C. Boden Kloss, Director of Museums Straits Settlements and Federated Malay States.

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I. INTRODUCTION

The Mentawi Group, to the west of Sumatra, consists of the islands of Siberut, Sipora, and North and South Pagi. The first and northernmost, roughly quadrilateral, about sixty geographical miles long and twenty-five wide, is larger than the other three (which are fairly equal in size) put together: there are also a number of small islands near their shores. The group lies parallel to the coast of Sumatra and about fifty to eighty miles distant: its northern extremity is Lat 1° South

Sipora Island had been visited by Dr. E. Modigliani in 1892 and Herr Alfred Maass in 1897 and the Pagi Islands by Dr. W. L. Abbott and myself in 1902, but Siberut Island had never been worked by naturalists until I landed there in September 1924 accompanied by Mr N. Smedley, Assistant Curator of the Raffles Museum, Singapore, Dr H. H Karny, Entomologist of the Zoological Museum, Buitenzorg, Java; and a party of native assistants. I had several times since the visit to the Pagi Islands applied to the Government of Netherlands India for permission to visit Siberut, but sanction had been withheld on account of the attitude of the Indonesian inhabitants, the last in the group to come under administration. At length in 1923, however, the Government was able to agree to a visit, and when the time came a year later to make it, gave assistance, as usual, in a most generous manner. A month was spent on Siberut (Sept —Oct.) and another on Sipora (Oct.- Nov.), and besides obtaining much zoological material, both vertebrate and invertebrate, collections of plants and ethnographical objects were made as well. Reports on all these, as prepared, are being published under the general title "Spolia Mentawiensia". The following have already appeared —

i. The Flora of the Mentawi Islands. H. N. Ridley, Kew Bulletin, 1926, pp. 56—94.

ii. Birds. F. N. Chasen and C. Boden Kloss, Ibis, 1926, pp. 269—306, pl. iii and map.

iii. Three new birds from the Mentawi Islands. J. H. Riley, Proc. Biol. Soc. Washington, XL, 1927, pp. 95—96.

iv. Reptiles and Amphibians. Malcolm A. Smith, Ann. Mag. Nat. Hist. (9) 1926, xviii, pp 76—81.

v. Zoraptera. H. H. Karny, Treubia, ix, 1926, pp. 1—5, pl. i, text-figs. 1—3.

vi. Dragonflies. F. F. Laidlaw, Journ. Malayan Branch Roy. Asiat. Soc. iv, 1926, pp. 214—233, figs. 1—5.

vii. Dermaptera. A. Borelli, *t.c.s.* pp. 384—391, figs. 1, 2.

viii. Fulgaroidea, Homoptera. F. Muir, *t.c.s.* pp. 392—412, figs. 1—34

ix. Homoptera—Fulgoroidea. C. F. Baker, Philippine Journ. Sci. xxxii, 1927, pp. 391—410, pl. i, text-figs 1—13.

x. Mantidæ. F. Werner, Treubia, ix, 1927, pp. 413—419.

xi. Mammals. F. N. Chasen and C. Boden Kloss, Proceedings of the Zoological Society of London, 1927, pp. 797—840, pls. i—v and Map.

xii. Acridiidæ (Orthoptera) C. Willemse, Journ. Malayan Br., Roy. Asiat. Soc., vi, 1928, pp. 1—12, pls. i—iii and text-figure.

xiii. Membracidæ, Homoptera. W. D. Funkhouser, *t.c.s.*, pp. 13, 14.

xiv. Pterydophyta. R. E. Holttum, *t.c.s.*, pp. 14—23, pl. iv

xv. Musci. H. N. Dixon, *t.c.s.*, pp. 23, 24.

Dr. H. H. Karny has also published an illustrated popular account of the visit:—Auf den Glücksinseln (mit 60 Abbildungen). Natur, xvii, 1926, pp. 9—16, 28—39, 60—67, 80—89, 102—110. (Leipsig).

The group is forested all over, and the collections were made at various localities near the Government stations of Siberut, in the island of that name, and Sioban in Sipora: they came from the sea-shore, low-lying ground, the swamps, cultivated areas, and from such hills are were accessible.

The islands are not very pleasant collecting-grounds: they are mostly swamp, out of which rise hills nowhere more than 1,500 feet high and generally difficult to get at, being surrounded by soft ground. The sago-palm is common. The native villages are situated on the banks of rivers some distance upstream, and there are scarcely any paths except those made by the Dutch military posts: these are generally through flat land and are often untraversable owing to floods. There is much rain throughout the year The islands are unhealthy. in spite of systematic employment of quinine and other precautions, all the members of a party of fifteen, except myself, suffered from malaria either on the islands or soon after leaving them.

As much on the latter account as because my period of absence from headquarters was limited, the Pagi Islands were not visited again.

The Mentawi Islands are apparently connected with each other by a sea-bottom of less than 100 fathoms, and most bathygraphical charts show a connection with Sumatra, *viâ* the Batu Islands to the north-east, by a narrow ridge of similar soundings; but I am inclined to doubt whether this ridge is as unbroken as indicated, for the faunas of the groups differ greatly; though the Mentawi Islands possess a much richer mammalian fauna than the undoubtedly deep-water islands of Simalur and Engano at the extremities of the West Sumatran chain of islands, the fauna is much more peculiar and differentiated than that of Nias Island, also represented as being within the one-hundred-fathom line.

Apart from the connecting ridge, the group is surrounded by depths of 100—500 fathoms of water; further, everywhere directly between it and Sumatra lies the long Mentawi Basin with depths of 500—1,000 fathoms Such conditions render several of the West Sumatran Islands, in spite of small size and lack of height, quite as distinct from each other and from the rest of Malaysia as the larger areas of that sub-region are from each other.

Various hypotheses have been offered as to the former conditions of the West Sumatran Islands, but most of them were made by students of the reptilian faunas.

In "Proceedings of the Zoological Society" (1927, pp. 707—807 and map) I discussed the past and present conditions of the Andaman-Christmas Island chain from the indications afforded by their mammals (q v.), which, with the birds, are the best known of their animal classes and which are more instructive than the latter.

We have nothing to say about the habits of the Mentawi Blattidæ. They were mostly secured by our native assistants and when a collector is endeavouring to obtain as much as he can of everything in a limited period he has no time for field studies. Dr. Hanitsch has aptly summed up this case.—"With most of us collectors the life history of an insect begins in the net and ends in the bottle!" C Boden Kloss.

II. PREFACE

The results of Mr Boden Kloss' expedition to the Mentawi Islands must be regarded as most satisfactory, a proof of the energy of the collectors. Not less than 53 species were obtained from this group (and two others from other localities only) some of them in huge numbers, *e g*, 51 examples of *Neoblattella digitata* n sp., 59 of *N hewitti* Shelf, *fusca* n. subsp., 101 of *Margattea nimbata* Shelf., 157 of *M. humeralis* Wlk., and 346 of *Epilampra communis* n. sp *

Considering how little is known as yet of the Blattid fauna of the Malaysian sub-region, it is not surprising that the 53 species collected include one new genus, 19 new species, and one new sub-species Most of the novelties belong to the Pseudomopinæ (Phyllodromiinæ), and future collections will probably bring in many more additions to that sub-family.

Notwithstanding the large number of species, old and new, and the many specimens taken, the collection revealed no startling new facts of distribution. Owing to the proximity of the Mentawi

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*Practically all the examples of this species came from the leaves of bananas. C B. K

Islands to Sumatra, their Blattid fauna shows, a close relationship to that of the larger island. The Blattidæ of Sumatra had so far been much less known than those of the three other great sections of the Malaysian sub-region, the Malay Peninsula, Borneo with Palawan and Java with Bali. In fact, in my paper on "Malayan Blattidæ", Part II, (Journ. Malayan Branch, Royal Asiat. Soc. I, 1923, pp. 393—474) I showed that whilst 116 species were known so far from the Malay Peninsula, 115 from Borneo, and 76 from Java, only 38 species had been recorded from Sumatra. However, since the publication of that paper four years ago, I have fortunately been able to examine three considerable collections from Sumatra, *viz.*, one from Wai Lima, Lampongs, S. Sumatra, made by Dr. H. H. Karny and Mr. H. C. Siebers (Nov.—Dec., 1921), one from Medan on the East Coast, made by Dr. E. Mjöberg (1919—1921), and one from Fort de Kock, on the West Coast, made by Mr. E. Jacobson (1922—1926). Thus the material from Sumatra at my disposal for comparison has been quite as large as that from the rest of the Malaysian sub-region.

The table at the end of the paper gives a list of the Blattidæ taken on this expedition, with their distribution. It shows that of the 53 species obtained, 25 species are common to Sumatra, 17 to Java, 22 to Borneo, and 30 to the Malay Peninsula. I am afraid these figures indicate in no way the true relationship, but merely express the degree to which the Blattid fauna of those places has been worked out.

There is also no proof that of the species collected any are peculiar to the Mentawi Islands. However, it seems curious that *Epilampra communis* n. sp., of which not less than 346 examples were taken, and such large and striking forms as *Homalopteryx karnyi* n. sp. and *Epilampra mentawiensis* n. sp., had not yet been recorded from Sumatra or elsewhere.

The collection includes the cosmopolitan forms *Blattella germanica* L., *Periplaneta australasiæ* Fab., and *Pycnoscelus (Leucophæa) surinamensis* L. These species constantly recur in collections from the East. However, *Stylopyga rhombifolia* Stoll and *Periplaneta americana* L. which are equally common, were not taken. When in my paper on "Blattidæ from Northern Sarawak, chiefly Mt. Murud and Mt. Dulit" (Sarawak Mus. Journ. III, 1925, p. 75) I stated that on those mountains, besides *Blattella germanica* L., no other cosmopolitan Blattid had been met with, I essayed the explanation that the white man with those hangers-on to civilization, had not before penetrated into those regions. The paucity of cosmopolitan forms in the Mentawi Islands may perhaps be similarly explained.

The types and a considerable portion of the rest of the collection will, with the courteous permission of the Director of Museums, Straits Settlements and Federated Malay States, and the Director of the Zoological Museum, Buitenzorg, Java, be kept in the Hope Department, University Museum, Oxford, and I wish in this place to express my thanks to Prof. Poulton, F.R.S., for so kindly allowing me to continue my work in the Department under his charge.

III. The genera **Anaplecta** Burmeister, **Anaplectoidea** Shelford and **Anaplectella** n.g.

In the year 1773 Charles de Geer[1] described a minute Cockroach, from Surinam, under the name of *Blatta minutissima*. The Insect measured only 2 lines (about 4 mm.) in length and was characterized by the tips of the wings being folded crossways. De Geer's description was meagre, but the enlarged illustration showed sufficiently clearly the transversely folded wings below the partly opened-out tegmina. Burmeister[2], in 1838, established the genus *Anaplecta* for this and three other New World forms, *viz.*, *A. lateralis*, from Colombia, *A. dorsalis*, from Porto Rico, and *A. unicolor*, from Colombia, and defined his new genus as possessing wings exceeding the tegmina by one-third of their length, which were folded longitudinally and then with their apex reflected over the rest of the wing. Saussure, in 1862—1868, added six species from Mexico, Guatemala and Colombia, and Brunner, in 1865, and Walker, in 1868, one each from Brazil The first Oriental species were recorded by Walker, *viz.*, *A. gyrinoides*, from Ceylon, in 1868, and *A. subrotundata*, from Bombay, in 1871 Gerstaecker, in 1883, described a species from W. Africa, Saussure, in 1895, one from the Sudan, and Rehn, in 1904, one from Queensland The genus was thus soon found to have a world-wide range.

In the meantime, in 1895, the first Malaysian species had been recorded by Saussure[3], *viz.*, *A javanica* Shelford[4], in 1906, described three more species from the same sub-region, *viz.*, *A. obscura* and *A. malayensis*, both from the Malay Peninsula, and *A. borneensis*, from Sarawak, to which, in 1923, I added *A. vittata*[5], from Singapore Island, and in 1925, three species from Sarawak, *viz.*, *A. cornea*[6], *A. maculifera* and *A. transversa*. They are all small Insects, the largest known Malaysian species not exceeding 7 mm., though A. *azteca* Saussure, from Mexico, reaches 10 mm in length

In all these species the ulnar vein of the wings is either simple or bifurcate. However, in the same paper in which Shelford described the above three Malaysian species of *Anaplecta*, he established a new genus, *Anaplectoidea*, for a very similar form from Batchian and Macassar, *viz.*, *Anaplectoidea nitida*, which differed from *Anaplecta* by the ulnar vein of the wings being multiramose. In the following years Shelford added *Anaplectoidea dohertyi*, from Sangir[1], *A. modesta*, from Ceylon[2], and *A. notata*, from Phuc Son, Annam, and recently I described another species from Annam[3], *viz.*, *A. klossi*, collected by Mr. C. Boden Kloss and Dr. Malcolm Smith at Tour Cham, Phanrang, S. Annam, in 1918.

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[1] Mémoires pour servir à l'histoire des Insectes, Vol. III, p. 542, pl XLIV, figs 13 and 14. Stockholm, 1773

[2] Handbuch der Entomologie, Vol. II, p. 404. Berlin, 1838.

[3] Ann. Mus Genova, (2), Vol. XV, p. 71 (1895)

[4] T. E. S., London, 1906, p. 242, pl. XV, figs. 10- 12.

[5] J. Malayan Branch, R. A. S, Vol. I, p 306, fig. 1 (1923)

[6] Sarawak Museum J., Vol. III, pp. 78—81, figs 1—3 (1925).

The apical area of the wing, both of *Anaplecta* and of *Anaplectoidea*, is more or less structureless, in any case it shows nowhere a resemblance to the close reticulation of the apical area of the wing in *Diploptera* Saussure (subfam. Oxyhaloinæ). However, besides by the fold, the apical area is always traversed by a vein which, starting at the base of the fold, may either lie entirely within the fold, or just behind it, forming in the latter case an acute angle with the fold, and ending just before reaching the margin of the apical area. This vein is apparently a continuation of the dividing vein and may be called the "apical vein". Shelford shows this vein in his illustrations (T. E. S., London, 1906, pls XV and XVI), but neither he or any other author seem to refer to it in their descriptions.

Restricting ourselves for the present to the species from the Malaysian sub-region, this apical vein lies *behind* the fold in all the three species described by Shelford, (*viz.*, *A. obscura*, *A. malayensis*, and *A. borneensis*), and also in the four additional species since recorded by me from this region (*viz.*, *A. vittata*, *A. cornea*, *A maculifera* and *A. transversa*). All these species also agree with each other in having the ulnar vein of the wing simple, and the first axillary vein 3-ramose.

However, in material I have recently examined from the Malay Peninsula, from Sumatra and now from the Mentawi Islands, there are forms closely allied to the ordinary type of *Anaplecta*, but differing from it by having the apical vein lying *within* the fold of the apical area. These forms also agree with each other in having the ulnar vein of the wing bifurcate, instead of simple, and the first axillary vein 4-ramose, instead of 3-ramose. These characters may justify the establishment of a new genus for which I propose the name of *Anaplectella*, the type of which is *A. smedleyi*, n. sp., from Sipora, described below. *Anaplecta thwaitesi* Shelford, from Ceylon, would come under the same new genus, and there are several similar forms from the Malay Peninsula and Sumatra which I hope shortly to describe in some other place. The species of *Anaplectella* which I have seen so far, also differ somewhat in external appearance from *Anaplecta*: they are generally more convex in shape and of a more uniform, darker colour.

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[1] A. M. N. H (7), Vol. XIX, p. 25 (1907).

[2] Deutsche Entom. Zeit., 1909, p. 611—612.

[3] J. Siam Soc., Nat. Hist. Suppl., Vol VII, p. 10, fig 1 (1927)

Anaplectella n. g. is also closely allied to *Anaplectoidea* Shelford. For there too the apical vein lies within the fold of the apical area, and the first axillary vein is 4-ramose, the chief difference between these two genera being that in *Anaplectoidea* the ulnar vein of the wing is multiramose. Less essential characters of *Anaplectoidea* are: size slightly larger, shape more elongate, colour a more or less uniform amber, apical area shorter.

These three genera may therefore be defined as follows:—

1. *Anaplecta* Burmeister: Wings with a large triangular apical area which, in a state of repose, is folded longitudinally and then reflected over the rest of the wing; posterior half of this area traversed by the apical vein, a prolongation of the dividing vein; ulnar vein simple; first axillary 3-ramose.
2. *Anaplectella* n. g.: allied to *Anaplecta* Burmeister, but the apical vein running within the fold of the apical area; ulnar vein bifurcate; first axillary 4-ramose.
3. *Anaplectoidea* Shelford. allied both to *Anaplecta* and to *Anaplectella* apical vein running within the fold of the apical area, ulnar vein multiramose; first axillary 4-ramose.

IV. The genus **Ischnoptera** Burmeister.

Hebard, in his "Studies in the group *Ischnopterites*" (Trans. Amer. Entom. Soc., Vol. XLII, pp. 337—383 (1906)) subjects the New World species of *Ischnoptera* to a thorough examination and comes to the conclusion that this genus, with its genotype *I morio* Burmeister, is almost entirely restricted to the New World, and proposes the name *Symploce* for the Old World forms. The armature of the front femora offers perhaps the readiest means for distinguishing these two genera. In *Ischnoptera* the front femora are armed after type B, *i.e.* the ventro-cephalic margin bears proximally a few heavy spines, which distally are followed by a row of minute piliform spines; in *Symploce* the armature is after type A, *i.e.* the spines are of a uniform character and decrease distally in size more or less gradually. Of the two new species of *Ischnoptera* described below, *I. klossi* would be an *Ischnoptera* in Hebard's sense, whilst *I. nigra* would come under his *Symploce*, as would also all other Malaysian species so far described under *Ischnoptera*, and to the types of which I happen to have access, *viz.*, *I. reversa* Wlk., *I. cavernicola* Shelf., *I. excavata* Shelf., *I. montis* Shelf., and *I. ridleyi* Shelf.—I hope at some future time to enter more fully into this question.

V. The genus **Phyllodromia** Serville.

In 1903, in the Proceedings, Entomological Society of Washington, Vol. V, pp 232—234, A N Caudell pointed out that the name *Phyllodromia* was pre-occupied by a Dipterous Insect and proposed the name *Blattella* instead. Shelford some years after, in Ent. Mo. Mag. (2), Vol. XXII, pp 154–6 (1911), published a revision and sub division of the genus which has since been generally accepted and which I am following in this paper. Shelford's subdivisions were based upon four characters, *viz* (1) whether the sexes are similar or not, (2) whether the discoidal sectors (*i.e.* the branches of the median and the ulnar vein) of the tegmina are longitudinal or oblique, (3) whether the front femora are armed after type A or type B,* and (4) whether an apical triangle is present in the wing, or not.

Put into the form of a key, we would get the following arrangement.--

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*For an explanation of these terms see above under *Ischnoptera*

Sexes similar ...	discoidal sectors longitudinal ...	femoral spines type A ...	wings: anterior part narrow: ulnar simple or bifurcate; no apical triangle ...	*Blattella* Caudell
			wings: anterior part broad ulnar ramose; no apical triangle ..	*Neoblattella* Shelf.
		femoral spines type B ...		*Margattea* Shelf.
	discoidal sectors oblique ..	femoral spines type A ...	no apical triangle ...	*Eoblatta* Shelf.
		femoral spines type A or B ...	large apical triangle ...	*Chorisoblatta* Shelf.
Sexes dissimilar ...	discoidal sectors oblique ...	femoral spines type A ...	ulnar ramose; no apical triangle ...	*Supella* Shelf.

The first three characters allow of a satisfactory sub-division of *Phyllodromia*. But it is otherwise with the fourth character, the apical triangle of the wing, and I am not aware that anyone since Shelford's time has used it for the purpose of classification. Of recent publications *e.g.*, it has no place in I. Bolivar's key of the Phyllodromiinæ, given in his "Orthoptera Dictyoptera of the Seychelles" (A. M. N. H. (9), Vol. XIII, p. 320 (1924)), nor in Hebard's key to the "Pseudomopinæ" in his "Orthoptera of the West Indies.—I. Blattidæ" (Bull. Amer. Museum Nat. Hist., Vol. LIV, p. 5 (1927)). The apical triangle is much more frequent and much more irregular in its occurrence than Shelford's classification would lead one to expect. It certainly does occur in many species of *Blattella*, *Neoblattella* and *Margattea*, *e.g.*, in the two new species of *Blattella* described below, in *Neoblattella irregulariter-vittata* Brunner, *N. hewitti* Shelf., *Margattea humeralis* Wlk., *M. maculata* n. sp., etc., whilst exactly in the three species of *Chorisoblatta* of this collection the apical triangle is less developed than in any of the forms just named.

However, the apical triangle is a character which may easily be left out in the sub-division of *Phyllodromia* and which little affects the validity of the six genera proposed by Shelford, only one change may be suggested: *Chorisoblatta* Shelf. includes at present forms with front femora armed after type A or type B Those species with type A might with advantage be transferred to *Eoblatta* Shelf.

VI. Account of the Collection.

ECTOBINÆ

1. Theganopteryx apicigera Walker.

Blatta apicigera Wlk. Cat. Blatt. B. M., p. 227 (1868).

Siberut, 2 ♀ ♀.

Known from all parts of the Malaysian sub-region.

2. Anaplecta javanica Saussure (pl. I, fig. 1).

Ann. Mus. Genova, (2), Vol. XV, p. 71 (1895).

North Pagi, 1 ♂.

This species, first described by Saussure from Batavia in 1895, had apparently not been recorded again, though there is in the Oxford Museum an unnamed specimen, taken by H. N. Ridley in the Botanic Gardens, Singapore, in 1908. It is readily distinguished by the character of the median vein of the wing, the middle portion of which, *viz.*, the part lying between the 1st and the 2nd transverse venules, is much fainter than the rest of the vein ("vena media......... in dimidiâ parte proximali evanida" Saussure).

The N. Pagi specimen may be described as follows —

♂ Head fusco-castaneous, labrum testaceous, eyes far apart, antennæ fuscous. Pronotum sub-oval, fusco-castaneous, shining, lateral margins yellowish hyaline Tegmina fusco castaneous, costal margin broadly yellowish hyaline; 7 costals. Wings hyaline, costal margin infuscated, 4 costals, medio-discal field with 3 transverse venules; median vein simple, the portion between the 1st and 2nd transverse venule much fainter than the rest; ulnar vein simple, ulnar field without transverse venules, 1st axillary 3 ramose; apical area barely 2/5 of the total wing length, basal margin straight, apical vein lying behind the apical fold Abdomen below testaceous, darker towards the sides Cerci 8-jointed No styles. Legs testaceous.

♂. Total length 3.5 mm

3. Anaplectella smedleyi n. g.* and sp (pl. I, fig. 2)

Sipora, 1 ♂.

♂. Dark castaneous—Head exposed, testaceous, vertex darker; eyes far apart; antennæ exceeding the body, testaceous Pronotum sub-oval, posterior margin only slightly rounded; disk shining black; margins broad, hyaline Tegmina slightly exceeding the body, fusco-castaneous, mediastinal area broad, hyaline, pale yellowish, 13 costals; ulnar 4-ramose Wings fuscous, costal and apical areas opaque, very dark brown; 5 costals, medio-discal field crossed by 4 venules, a fifth incomplete, ulnar bifurcate; 1st axillary 4-ramose. Apical area parabolic, base slightly obtusely angled, 2/5 of total wing length; apical vein lying within the apical fold Abdomen below shining castaneous to black Cerci dark brown Right style present (left missing ?). Legs light testaceous

♂. Total length 7 mm.

Closely allied to *Anaplecta thwaitesi* Shelford, from Ceylon, the type of which is in the Oxford Museum. It differs from it by its considerably darker colour, the number of the costals both of tegmina (*viz.* 13 instead of 11) and wings (5 instead of 6), and the number of transverse venules of the medio-discal field (4 instead of 5). *Anaplecta thwaitesi* will have to be placed under this new genus, as also two or three species from Sumatra, collected by Dr. E. Mjoberg (1919—1921), which I shall describe elsewhere.

4. Anaplectoidea saundersi, n. sp. (pl. I, figs. 3, 4 and 5).

Siberut, 1 ♂, 3 ♀♀. Sipora, 1 ♂.

♂. Amber-coloured.—Head uniform pale orange, eyes moderately far apart, antennæ exceeding the tegmina, pale testaceous. Pronotum sub-circular, on either side drawn out into an obtuse angle; disk pale orange, with two comma-like black spots; lateral margins hyaline, faintly orange. Tegmina exceeding the body, pale amber, diffused with darker orange-amber from the base of the radial and ulnar veins, spreading out along the hind border of the mediastinal area and the anterior border of the anal sulcus, a triangular shaft of orange projecting from behind into the anal area. 13 costals, 6 discoidal sectors; 5 faintly marked anals. Wings hyaline, slightly fuscous, costal and apical areas densely fuscous. 13 costals, clavated; medio discal area with 10 transverse venules, median vein simple, ulnar vein strongly sinuous, with 3 branches, apical area barely [illegible] of the length of the wing, base obtusely angled, first axillary bifurcate, its anterior half giving off another branch which bifurcates once more. Abdomen below testaceous, sides darker. Sub-genital lamina triangular to rounded. Cerci testaceous. Two styles, centrally placed, close to each other. Legs testaceous.

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*For a description of this new genus see antea p. 8

♂. Total length 9 mm.

♀. Agrees in most respects with the ♂, especially in the colouring of the tegmina. Differences are: the ulnar of the wing of the ♀ bifurcates at about 3/5 from its origin, the anterior branch bifurcating once more, the final result thus being 3, instead of the 4 branches in the ♂; the 1st axillary of the wing of the ♀, instead of bifurcating, gives off 3 branches more or less parallel to each other, the final result being 4 branches, as in the ♂.—Sub-genital lamina rounded. One ♀ with egg case, placed horizontally, suture to the right.

♀. Total length 8 mm.

This species is identical with several specimens which Mr. C. J. Saunders, late of the Straits Settlements Civil Service, took a few years ago on Singapore Island, *viz.* in the jungle at the Impounding Reservoir, Thomson Road, Nov. 1922, and on Bukit Timah, Nov. and Dec. 1922. I have therefore much pleasure in naming this species after him. I referred to these Singapore specimens in my recent paper "On a Collection of Blattidæ from Southern Annam" (J. Siam Soc., N. H. S., Vol. VII, p. 10 (1927)), when I regarded them as "very similar to, if not identical with *A. notata* Shelf." The type (♂) of this latter species, from Phuc Son, Annam, is in the Oxford Museum, and it is certainly very closely allied to *A. saundersi*. The branching of the ulnar of the wings is identical in the two species, and the difference in the number of costals is only slight, *viz.* 15 costals in the tegmen, and 14 costals in the wing of *A. notata*, against 13 costals both in the tegmen and in the wing of *A. saundersi*. More important probably is the colour of the pronotum: *A. notata* has the disk castaneous, but *A. saundersi* pale orange, with two black dots.

The species of *Anaplectoidea* Shelford, described so far are:—

A. nitida Shelf., from Celebes and Batchian. T. E. S., 1906, p. 248, pl. XVI, figs. 8 and 9.

A. dohertyi Shelf., from Sangir, A. M. N. H. (7), Vol. XIX, p. 25 (1907).

A. modesta Shelf., from Ceylon, Dentsche Ent. Zeit., 1909, p. 611.

A. notata Shelf., from Phuc Son, Annam, Dentsche Ent. Zeit., 1909, p. 612.

A. klossi Hanitsch, from Tour Cham, Phanrang, S. Annam, J. Siam Soc., Nat. Hist. Suppl., Vol. VII (1927), p. 10, fig. 1.

A. saundersi Hanitsch, from Singapore and Mentawi Is.

PSEUDOMOPINÆ (PHYLLODROMIINÆ)

5. Pseudothyrsocera rubro-nigra Hanitsch.

Phyllodromia rubro-nigra Hanitsch. Journ. Malayan Br., R. A. S., Vol. I, p. 412, figs. 11 and 12 (1923)

Siberut, 8 ♂ ♂, 1 ♀; Sipora, 1 ♂.

I have removed this species to *Pseudothyrsocera* Shelford, as its antennæ are hirsute, though only to a slight degree, and the ulnar vein of the tegmina angled. The types (♂ and ♀) came from Gunong Angsi, Negri Sembilan, 2,000′–2,700′, where I took them in April 1918, but both this species and *Pseudothyrsocera* (Blatta) *xanthophila* Walker, to which it is closely allied, differing only by its much darker colour, occur also on Sumatra. M. E. Jacobson took examples of the two species at Fort de Kock, 920 m., (1922—1926).

6. Ischnoptera klossi n. sp.

Siberut, 4 ♂ ♂; Sipora, 3 ♂ ♂, 2 ♀ ♀.

♂. Castaneous.—Head slightly exposed, uniform testaceous; eyes far apart; antennæ somewhat exceeding the tegmina, fuscous to black. Pronotum with the anterior margin parabolic, posterior margin rounded; testaceous, with a large U-shaped mark, open in front. Tegmina exceeding the body by ¼ to ⅓ of their length, castaneous, mediastinal area and costal margin pale testaceous; radial vein bifurcating near base, 18 costals, 8 discoidal sectors; and sulcus reaching to 2/5 of the sutural margin; 6 anals. Wings fuscous, costal area almost black, mediastinal vein 3-ramose, radial vein simple, sinuous; 12 costals, all stout, distally not incrassated; median vein simple, strongly sinuous, ulnar vein sending 5 branches to the apex, and two very short ones to the dividing vein; apical triangle conspicuous; 1st axillary with 3 branches; cross venules stout, especially between the radial and the median vein, and between the branches of the ulnar. First abdominal tergite testaceous, the succeeding ones darker, the 6th almost black, the 7th testaceous. Abdomen below testaceous. Supra-anal lamina triangular, apex truncate, posterior margin slightly excised in the middle. Sub-genital lamina produced, posterior margin excised, leaving a small triangular lobe projecting on either side. Cerci testaceous. Left style cylindrical, right style acuminate, both hirsute. Legs testaceous; front femora with 3 large spines on the anterior margin, followed by a series of minute piliform spines; hind femora strongly armed.

♂. Total length 15 mm.; body 11 mm.; pronotum 3 × 4 mm.; tegmina 12 mm.

♀ Similar to the ♂. Supra-anal lamina produced, rounded, entire, shining black. Sub-genital lamina ample, rounded, entire, rufo-testaceous.

As pointed out under *Ischnoptera* (p. 8), this is the only known Malaysian species of the genus, in which the front femora are armed after type B.

7. **Ischnoptera nigra** n. sp. (pl. I, fig. 6).

Siberut, 2 ♂♂; Sipora, 2 ♂♂; N. Pagi, 2 ♂♂.

♂. Shining black.—Head only barely projecting, shining black; eyes moderately far apart; antennæ somewhat exceeding the tegmina, black, fuscous distally. Pronotum sub-circular, lateral margins slightly inverted; shining dark castaneous to black, margins very narrow, deep orange. Tegmina much exceeding the body, shining fuscous black, radial vein bifurcate from near base, 15 costals; 6 discoidal sectors; anal sulcus prominent, 6 anals. Wings fuscous, irridescent, costal margin opaque, almost black, all the veins black; mediastinal vein more than half the length of the wing, 3-ramose; 10 costals, median vein simple, ulnar vein stout, with 6 branches, two of which go to the dividing vein, the others to the apex; 1st axillary 4 ramose. Abdomen below dark castaneous. Supra-anal lamina rounded, entire. Sub-genital lamina large, triangular. Cerci black. Left style normal, right style shifted towards the apex of the sub-genital lamina. Legs long, fusco-castaneous, heavily spined; front femora on the anterior edge with 4 large spines, followed by 5 shorter ones (type A).

♂. Total length 16 mm.; body 11 mm.; pronotum 3·2 × 4 mm.; tegmina 12 mm.

Readily distinguished by its black colour from all other Malaysian species of *Ischnoptera*.

8. **Blattella germanica** Linné.

Blatta germanica L., Syst. Nat. (ed XII), Vol. I, p. 668 (1767).

Siberut, 4 ♀♀; Padang, 4 ♀♀.

Cosmopolitan.

9. **Blattella ridleyi** n. sp. (pl. II, fig. 6)

Siberut, 1 ♀.

The description of this species is based upon three specimens, *viz.* a ♀, from Siberut; a ♂ in the Oxford Museum, from the Botanic Gardens, Singapore (H. N. Ridley, April—June, 1908); and a ♂ in material I have here from the Raffles Museum, taken at Tanglin, Singapore (C. J. Saunders, July 1918).

Taking the earlier Singapore ♂ example as type, the description is as follows

♂. Small. Strikingly marked: dark castaneous, with broad, cream-white margins on pronotum and tegmina. Head exposed, testaceous, vertex with 4 longitudinal castaneous stripes; front castaneous, with a median yellowish stripe reaching down to the middle of the front, eyes far apart; antennæ (mutilated) yellowish testaceous. Pronotum sub-oval, hind margin straight, dark castaneous, with broad, milk-white lateral margins. Tegmina exceeding the abdomen, reaching to the tips of the cerci; deep castaneous, with broad, milk white margins, occupying practically the whole of the mediastinal and costal areas, the boundary line between the castaneous and the white portions being zig-zag shaped, about 20 costal veins, with close reticulation between them, 6 longitudinal discoidal sectors. Wings hyaline; radial vein single, 12 costals, their ends incrassated into orange-coloured knobs; median vein straight, simple, 8 strongly marked and widely spaced cross venules between the radial and the median vein; ulnar vein bifurcate; apical triangle conspicuous, 1st axillary 3-ramose. Abdomen below brownish. Sub-genital lamina produced, triangular. Cerci testaceous, tips black. Styles symmetrical. Legs testaceous; front femora with a few weak spines near the centre (type A).

♂ Total length 8 mm

The ♀ from Siberut differs from the two ♂ ♂ Singapore specimens in the following minor points: face mottled testaceous and light castaneous; wings with 11 costals, and 12 cross-venules between the radial and the median vein; abdomen below shining black, sub-genital lamina light castaneous, with its posterior border milky-white.

♀ Total length 8 mm

10. **Blattella tristis** n. sp

Siberut, 1 ♂, 1 ♀. (Also Medan, Sumatra: Mjoberg, 1 ♂).

♂. Small.—Head exposed, shining, dark castaneous; eyes far apart; antennæ testaceous, as long as the body. Pronotum sub-circular, posterior margin straight; disk dark castaneous, lateral margins dark amber. Tegmina just exceeding the cerci, amber-coloured; costal area broad, 12 costals, 5 longitudinal discoidal sectors, anal sulcus deeply impressed, 5 anal veins. Wings hyaline, mediastinal vein bifurcate, ends swollen; radial vein straight, simple; 12 costals, the first 7 distally much swollen, forming an opaque area in the middle of the anterior border of the wing; median vein simple, 8 well-marked cross-venules between the median and the radial vein; ulnar vein bifurcate, posterior branch terminally once more bifurcate; apical triangle conspicuous; 1st axillary bifurcate, each half bifurcating again. Abdomen below dull testaceous. Supra-anal lamina triangular. Sub-genital lamina rectangular, nearly as long as broad. Cerci brownish. Styles symmetrical. Legs fusco-castaneous; front femora with a few weak spines near the centre (type A); hind femora weakly spined.

♂. Total length 8 mm.; body 6 mm ; tegmina 6·5 mm.

♀. Similar to the ♂. Tegmina with a diffused fuscous blotch between the anal sulcus and the protimal costal veins. Wings with 13 costals, the first 8 distally much swollen; 11 cross-venules between the median and the radial vein. Abdomen below much darker than in the ♂, almost piceous Sub-genital lamina ample, rounded, with a slight median indentation

♀. Total length 8·5 mm ; body 6·2 mm.; tegmina 6·8 mm.

Allied to *Blattella* (*Blatta*) *funebris* Walker, from Sarawak, the type (♂) of which is in the Oxford Museum, but smaller, its head piceous, instead of orange, and its tegmina amber, instead of blackish.

11. **Neoblattella irregulariter-vittata** Brunner.

Phyllodromia irregulariter-vittata Brunner. Abh. Senck Ges., Vol XXIV, p 202 (1898)

Siberut, 1 ♂, 1 ♀. Sipora, 6 ♂ ♂, 3 ♀ ♀ ; N. Pagi, 2 ♂ ♂.

First described by Brunner, from Borneo and Java. Both the Museums at Oxford and Cambridge contain a specimen each, taken by Shelford in Sarawak (1900—1903) I have recorded this species from Mt Murud, Sarawak, (E. Mjoberg, 1922) and have also before me a series from Wai Lima, S. Sumatra (Karny and Siebers, 1921).

I supplement Brunner's description which is short and based upon a ♀ only, by that of a ♂ from Sipora.

♂. Large, castaneous.—Head slightly exposed, pale orange; eyes moderately far apart; antennæ fuscous. Pronotum with the anterior margin parabolic, posterior margin slightly produced; orange, disk on either side with a broad irregular black vitta, the two vittæ not quite meeting in front and behind, and enclosing a narrow orange space between them. Tegmina much exceeding the abdomen, castaneous, costal margin flavescent, radial vein bifurcate from its middle; 20 costals; 7 longitudinal discoidal sectors; anal sulcus prominent, 6 anals Wings dark fuscous, middle portion of the costal margin yellowish; mediastinal vein 3-ramose; radial vein bifurcate at 2·5 from its base; 14 costals; median vein simple, strongly sinuous; ulnar 3-ramose; apical triangle prominent; 1st axillary 5-ramose. Abdomen above dark fuscous, with light lateral margins; abdomen below pale orange testaceous. Supra-anal lamina narrow, transverse. Sub-genital lamina much produced. Cerci dark brown. A single style, curved, on the right, none on the left. Legs orange testaceous. Front femora with 4 large spines on the anterior margin, followed by about 4 smaller spines (type A).

12. **Neoblattella hewitti** Shelford, **fusca** n. sub-sp.

Siberut, 20 ♂ ♂, 11 ♀ ♀ ; Sipora, 15 ♂ ♂, 11 ♀ ♀ ; N. Pagi, 1 ♀, 1 ♂.

♂. Large, light castaneous.—Head only slightly exposed, orange, eyes moderately far apart, antennæ fuscous. Pronotum with the anterior margin parabolic, posterior margin rounded, produced; disk orange, lateral margins pale orange, posterior margin diffused with fuscous. Tegmina much exceeding the body, light castaneous, only the mediastinal area hyaline; radial vein bifurcate from just beyond its middle, 20 costals, 8 longitudinal discoidal sectors, anal sulcus prominent, 6 anals. Wings dark fuscous, costal margin orange, mediastinal vein 4-ramose, radial vein sinuous, bifurcate from its middle, 16 costals, median vein sinuous, simple, ulnar 3-ramose, apical triangle conspicuous. Body below dull orange. Supra-anal lamina large, triangular. Sub-genital lamina sub-quadrate. Cerci dull orange. No styles. Legs testaceous to orange; front femora with 4 large spines on the anterior margin, followed by about 6 spines which are only slightly smaller (type A); posterior femora strongly armed.

♂. Total length 18 mm.; body 12 mm ; pronotum 4 × 5 mm ; tegmina 16 mm.

♀. Similar to the ♂, sub-genital lamina ample, rounded.

Differs from *Neoblattella (Phyllodromia) hewitti* Shelford, (A. M. N. H. (7), Vol XIX, p. 33 (1907)) chiefly by the colour of the wings which are fuscous, instead of orange. Besides the type (♂), in the Oxford Museum, from Kuching, Sarawak, I have seen another Bornean example (♀), presented by Shelford to the Cambridge Museum, also specimens from Mt Murud and the Kalabit country, Sarawak (E. Mjoberg, 1922), further specimens from the Malay Peninsula, *viz.* from Gunong Tahan, Pahang, 3,300′ (E. Seimund, Nov. 1920) and from the Tahan, River, Pahang (H. M. Pendlebury, Nov. 1922) and in all these the wings are of a pale orange colour, with the costal area dark orange. On the other hand, examples taken by Karny and Siebers at Wai Lima, Lampong, S. Sumatra, in 1921, have the wings fuscous and thus agree with the n. sub-sp. from Mentawi

13. **Neoblattella digitata** n. sp. (pl. I, fig. 7).

Pulau Tello, Batu Islands, 2 ♂ ♂ ; Siberut, 14 ♂ ♂, 2 ♀ ♀ ; Sipora, 17 ♂ ♂, 7 ♀ ♀ ; N. Pagi, 7 ♂ ♂, 2 ♀ ♀.

♂. Head exposed, shining dark castaneous to black; antennæ dark fuscous, exceeding the body. Pronotum parabolic in front, moderately produced behind; disk orange-testaceous, with a large, dark castaneous blotch in front, sending off a number of finger-like processes backwards; posterior margin with a broad, dark castaneous border; lateral margins broadly hyaline. Tegmina much exceeding the body, mediastinal area sub-hyaline, pale yellowish; remainder of tegmina uniformly dark amber to light castaneous; costal area as wide as the discoidal area; 14 costals; 10 longitudinal discoidal sectors; anal sulcus prominent, dark castaneous, 6 anal veins. Wings hyaline, costal margin sub-fuscous, cloudy markings close behind the apical triangle; mediastinal vein bifurcate, ends thickened; radial vein bifurcate at ¾ from its base, 11 costals, all the costals incrassated, a fuscous patch extending from the mediastinal to the 5th costal; posterior branch of the radial multi-ramose, ending in 5 branches; median vein straight, simple; ulnar vein multi-ramose, ending in 6 branches; apical triangle well developed; 1st axillary 5-ramose. Abdomen below testaceous, with marginal and sub-marginal dark blotches. Supra-anal lamina triangular, slightly notched. Sub-genital lamina ample, more than half as long as broad. Cerci testaceous, hirsute. Styles symmetrical, a few fine setæ at the apex. Legs dark testaceous, heavily armed; front femora on the anterior margins with 5 large spines, followed by 7 smaller spines (Type A.).

♂. Total length 19 mm.; body 12 mm.; pronotum 4·2 × 5 mm.; tegmina 15 mm.

♀. Similar to the ♂. Sub-genital lamina ample, middle portion of anterior margin testaceous, remainder shining black. Type with large ootheca, black, with close, longitudinal striæ, suture uppermost.

♀. Total length 18 mm.; body 12·5 mm.; pronotum 5 × 5·5 mm.; tegmina 13·5 mm.

A ♂ example, from N. Pagi, differs from the others by the ulnar of the wing sending a short branch to the dividing vein, thus resembling an *Ischnoptera*. However, I think it unnecessary for the present to establish even a n. subsp. for this one aberrant form.

14. **Neoblattella latimarginata** n. sp.

Siberut, 4 ♂♂, 3 ♀♀; Sipora, 11 ♂♂, 10 ♀♀; N. Pagi, 4 ♂♂, 4 ♀♀.

♂. Castaneous, with pale margins.—Head slightly exposed, pale castaneous, with three dark transverse bands on the face; eyes apart by ⅓ the width of the head; antennæ exceeding the tegmina, testaceous. Pronotum with the anterior border parabolic, posterior border slightly produced; disk with a large triangular castaneous blotch, lighter in the middle line; lateral margins broad, semi-hyaline, pale testaceous. Tegmina much exceeding the abdomen; mediastinal area, and the outer and larger portion of the costal area pale testaceous, semi-hyaline; remainder of the tegmina castaneous, darkest in the anal area; 10 costals, 9 longitudinal discoidal sectors, 5 anals. Wings pale fuscous; middle of the costal margin dark fuscous, apex of wing orange; veins stout, dull orange; mediastinal and radial veins simple; 8 costals, first six simple, their ends incrassated, 7th bifurcate, 8th ramose, median vein almost straight, bifurcate; ulnar with 5 branches, cross venules stout; apical triangle large; 1st axillary with 4 branches. Abdomen below testaceous, black in the centre. Supra-anal lamina narrow, triangular. Sub-genital lamina large, ending in two small triangular lobes, at the base of which, on either side, there is a depression in which the styles lie concealed. Cerci long, light castaneous. Legs uniformly testaceous, strongly armed; front femora with the proximal one-fourth unarmed, middle portion with 4 or 5 large, irregular spines, followed by about 7 somewhat smaller, regular spines (Type A.)

♀. Sub-genital lamina ample, rounded. Pronotum considerably lighter than in the ♂, disk uniform orange brown.

♂ and ♀. Total length 19 mm., body 15 mm., pronotum 4·1 × 4·5 mm.; tegmina 16 mm.

[15. **Neoblattella radicifera** n. sp.

Padang, W. Sumatra, 1 ♀.

As the single specimen taken on this expedition is not in perfect condition, the following description is based upon a ♀ from Fort de Kock, Sumatra, 920 m. (E. Jacobson, 1924). Several ♂ ♂ from that and other localities (*see* below) are unfortunately also less perfect than the ♀ ♀ obtained.

♀. Head exposed, testaceous, a large round brown macula between the eyes, eyes moderately far apart, antennæ testaceous. Pronotum sub-oval, slightly produced behind; disk dull fulvous, its posterior half with two V or Y shaped brown maculæ, of somewhat rugged, root-like outline (hence the specific name); lateral margins broadly hyaline. Tegmina much exceeding the abdomen, pale testaceous, almost hyaline; radial vein bifurcate at ⅗ of its length; about 20 costals, 7 longitudinal discoidal sectors, anal area much elongated, reaching to nearly the middle of the sutural margin, 7 anals. Wings pale fuscous, mediastinal vein quite 3/5 the length of the wing, 4 ramose; radial vein bifurcating at 3/5 of its length, from the base of the 4th costal; 9 costals, stout; median vein only slightly sinuous; ulnar vein 3-ramose; transverse venules strongly marked; apical triangle only slightly developed, long and narrow; 1st axillary 4-ramose; transverse venules between the axillaries of washed-out appearance. Body below testaceous, with diffused darker sub-marginal maculæ. Supra anal lamina small, rounded, sub-triangular. Sub-genital lamina ample, rounded. Cerci black and white banded. Legs testaceous, moderately spined, anterior femora on the inner margin with 4 large spines, followed by a few smaller spines (type A.).

♀. Total length 15 mm.; body 9 mm; pronotum 3 × 4 mm, tegmina 12 mm.

♂. Similar to the ♀. Supra-anal lamina triangular. Subgenital lamina triangular. Styles not observed.

The transverse venules arising from the ulnar of the wing before it divides are in some cases so strongly developed and directed apically, that this species can be regarded as an *Ischnoptera* in the making.

Distribution.—This species has a considerable range. Besides the material from Padang and Fort de Kock, I also have examples from the following localities: Wai Lima, S. Sumatra (Karny and Siebers, Nov.—Dec. 1921); Medan and Sibolangit, E. Sumatra (E. Mjoberg, 1919--1921); Kuala Lumpur (H. M. Pendlebury, Oct. 1922); Jor Camp, Perak, 2,000′ (E. Seimund, Aug. 1922); Kuala Tahan, Pahang (H. M. Pendlebury, Nov. 1921); Upper Pran River, Peninsular Siam (Major W. R. S. Ladell, April 1926).

16. **Margattea contigua** Walker.

Blatta contigua Walker Cat. Blatt. B. M., p. 228 (1868).

Pulau Tello, Batu Islands, 2 ♂♂, 1 ♀; Siberut, 4 ♂♂, 3 ♀♀; Sipora, 2 ♀♀.

Originally described from New Guinea, I have already recorded this species from Mt. Dulit, Sarawak, and have seen a long series from the Kei Islands (Mr. H. C. Siebers, 1922), also 1 ♂ from Klong Rang Sit, Siam (Major W. R. S. Ladell, May 1926). In recording it from Mt. Dulit, I gave my reasons why this species should be kept separate from *P. propinqua* Wlk., Sarawak Museum Journal, Vol. III, p. 82, 1925. Walker's description of two pale brownish bands across the head ("caput fuscescente bifasciatum") is correct. These two bands are separated by a narrow, porcelin-white crossbar just above the antennal sockets, and it is this character by which the species is most readily recognized. Walker mentions its unusually long cerci. In a ♂ from Pulau Tello, 14.5 mm. in total length, the cerci measure 4 mm. and consist of 14 joints.

17. **Margattea humeralis** Walker.

Blatta humeralis Walker. Cat. Blatt. B. M., Suppl., p. 140 (1869).

Phyllodromia contingens Shelford (partim). T. E. S. 1906, p. 490, pl. XXX, fig. 4; Gen. Ins., fasc. 73, p. 13 (1908).

Phyllodromia abrupta Hanitsh. J., Malayan Branch, R. A. S., Vol. I, p. 399 (1923).

Siberut, 16 ♂♂, 55 ♀♀; Sipora, 27 ♂♂, 51 ♀♀; N. Pagi, 2 ♂♂, 6 ♀♀.

Shelford regarded this species as synonymous with *Phyllodromia* (*Blatta*) *contingens* Walker, but an examination of the types both of which are in the Oxford Museum, has convinced me that they represent distinct species. I also find that *P. abrupta* mihi, is nothing but *M. humeralis* Wlk. and must therefore be suppressed. This species is readily recognized by a dark stripe, running along the radial vein of the tegmina, which is absent in *P. contingens* (Walker: "a tawny stripe extending in the disk from the base nearly to the tip; a brown streak along the humeral trunk").

The type of *B. humeralis* Walker came from Singapore, and that of *P. abrupta* mihi, from Ginting Bidei, Selangor, 2,000′ (C. B. Kloss, April 1917). Also taken by Capt. H. M. Pendlebury in the Gombak Valley, K. Lumpur (Oct. 1921) and at Batang Padang, Perak (May 1923), and by Drs. Karny and Siebers at Wai Lima, S. Sumatra, Nov. - Dec. 1921.

[18. **Margattea propinqua** Walker.

Blatta propinqua Wlk. Cat. Blatt., B. M., p 228 (1868)

Phyllodromia contigua Shelford (partim), Gen. Ins., 73, p. 14 (1908)

Pulau Tello, Batu Islands, 2 ♂♂.

Originally described from Celebes, the type (♂) being in the Oxford Museum, and now for the first time recorded from the Malaysian sub-region. Shelford regarded it as synonymous with *Phyllodromia contigua* Wlk, but, though closely allied, the latter species can always be distinguished by the porcelain-white cross bar just above the antennal sockets.

The following may replace Walker's meagre description

♂. Head freely exposed, uniformly orange testaceous; eyes far apart; antennæ exceeding the body, testaceous. Pronotum large, oval, posterior border almost straight; disk dull orange, with a blackish comma-like mark in the centre of each half; lateral margins broad, hyaline. Tegmina much exceeding the abdomen, sub-hyaline, pale testaceous; costal area broad, 11 costals, of which the first 8 are simple, the remaining bifurcate; 7 longitudinal discoidal sectors; anal sulcus reaching to nearly the middle of the posterior border of the tegmen; 5 anals. Wings hyaline, veins dull orange; mediastinal vein bifurcate, ending beyond the middle of the costal border; radial vein straight, simple; 7 costals, the fifth 3-ramose, the others simple, terminally not incrassated; median vein simple, almost straight; ulnar 6-ramose; apical triangle inconspicuous; 1st axillary 4-ramose. Abdomen below dull orange. Supra-anal lamina sub-quadrate, posterior border with 3 short lobes, the two lateral ones bearing the styles. Cerci long, dull orange, semi-transparent. Styles small. Front femora with two small spines near the centre of the anterior margin, followed by a close series of piliform spines (type B.).

♂. Total length 15 mm.; body 11 mm.; pronotum 3 × 4·2 mm.; tegmina 12 mm.]

19. **Margattea latius-vittata** Brunner.

Phyllodromia latius-vittata Brunner. Abh. Senck. Ges Vol. XXIV, p. 202 (1898).

Siberut, 1 ♂, 2 ♀ ♀; Sipora, 1 ♂.

Hitherto known from Java, Singapore and Macassar only. Brunner's description which gives little more than the colour, may be supplemented by that of a ♂ from Siberut:

♂. Tegmina: radial vein simple, 15 costals, 7 longitudinal discoidal sectors; 6 anals. Wings, light fuscous, costal area dark fuscous; mediastinal vein 3-ramose; radial vein simple; 12 costals, their ends incrassated; median vein simple, strongly sinuous; ulnar 3-ramose; apical triangle small; 1st axillary 5-ramose. Abdomen below testaceous. Supra-anal lamina narrow, transverse. Subgenital lamina much produced, longer than broad, triangular. Cerci stout, hirsute. Styles ? Legs testaceous; front femora armed after type B.

♀. Similar to the ♂. Sub-genital lamina ample, rounded, testaceous, with a dark fuscous blotch in its centre.

20. **Margattea nimbata** Shelford.

Phyllodromia nimbata Shelf. A. M. N. H. (7), Vol. XIX (1907), p. 31.

Pulau Tello, Batu Islands, 2 ♂ ♂, 1 ♀; Siberut, 14 ♂ ♂, 15 ♀ ♀; Sipora, 30 ♂ ♂, 27 ♀ ♀; N. Pagi, 9 ♂ ♂, 3 ♀ ♀.

This species, originally described from Sarawak, is common in the Malay Peninsula. I have already recorded it from Singapore (J. Malayan Branch, R. A. S., Vol. I, p 410 (1923)), but have taken it also on Kedah Peak, 4,000′, Nov. 1915, on Gunong Kledang, Perak, 2,646′, Nov. 1916, and on Penang Hill, 2,000′, May 1917. Additional localities are: Kota Tinggi, Johore (V. Knight, Aug 1917); Tamang, Pahang, 3,500′ (H M. Pendlebury, June 1923), Kuala Lumpur (H. M. Pendlebury, April 1924), Patalung, Peninsular Siam (I. H. N. Evans, May 1924). Also taken in Sumatra, *viz.* at Medan and Tjinta Radja (E. Mjöberg, 1910—1921), and at Wai Lima, Lampong (Karny and Siebers, Nov.—Dec. 1921)

Shelford, in his later papers, seemed to regard this species as synonymous with *P. ceylonica* Saussure, but having not seen the type of this latter species I cannot express an opinion.

21. **Margattea anceps** Krauss.

Blatta anceps Krauss. Semon's Zool. Forsch. Austral u Mal. Arch., Vol. V, p. 749 (1903).

Phyllodromia anceps Shelford. Gen. Ins. fasc. 73, p. 14 (1908).

Phyllodromia nigro-vittata Hanitsch. Sarawak Mus. J., Vol III, p. 88 (1925).

Siberut 2 ♂ ♂, 4 ♀ ♀; Sipora 1 ♂.

Krauss described this species originally from Tjibodas, Java, and I recorded it (loc. cit), but unfortunately under a new name, from Mt. Murud, Sarawak, from Singapore, and Bukit Kutu, Selangor, 3,457′ I also took it on Penang Hill (May 1917) and Gunong Angsi, Negri Sembilan, 2,000′ (April 1918)

Corrected description of the venation

Tegmina. radial vein single; 14 costals; 8 longitudinal discoidal sectors, 5 anals

Wings mediastinal vein with 2 branches; radial vein single; median vein simple, almost straight; 10 costals, the first six with their apices clavately incrassated, ulnar vein with 5 terminal branches; apical triangle well developed.

22. Margattea argentea n. sp.

Siberut, 5 ♂ ♂, 4 ♀ ♀, Sipora, 4 ♂ ♂, 3 ♀ ♀; N Pagi, 1 ♂.

♂. Silvery grey—Head exposed, light testaceous, 4 dark cross bands on the face, the first, narrow and black, above the antennal sockets, the second, broader and chestnut, between the antennæ, the third and fourth, also broad and chestnut, below, eyes moderately far apart; antennæ exceeding the tegmina, light testaceous. Pronotum sub oval, broad; disk testaceous, with brownish dots and vermiculations, lateral margins broad, hyaline. Tegmina exceeding the body by nearly ⅓ of their length, hyaline, pale grey suffused, mediastinal area broad, granular; costal area almost half the width of the tegmen, radial vein simple, 12 costals, 7 longitudinal discoidal sectors, anal sulcus pronounced, extending to one-third of the sutural margin, 5 anals, in reflected light appearing as interrupted silvery white lines, distal third of the tegmina with broad brownish cross venules Wings clear hyaline, mediastinal vein long, extending considerably beyond one-half of the costal border, bifurcate, ends incrassated; 8 costals, the first five with their ends incrassated; median vein simple, straight; ulnar vein 4-ramose; apical triangle conspicuous, a greyish blotch just behind it; 1st axillary 4-ramose. Abdomen below testaceous, a large black blotch in its centre, each segment with a pair of submarginal brown maculæ. Supra-anal lamina triangular. Sub-genital lamina rounded, half as long as broad Cerci testaceous, apex and a subterminal spot black. Two styles, symmetrical, testaceous. Legs pale testaceous, with black spots at the base of the tibial spines; front femora with about 4 spines near the middle of the anterior margin, followed distally by a series of piliform spines (type B); posterior femora with 4 spines both on the anterior and posterior margins.

♀. Similar to the ♂. A longitudinal black streak on the sub-genital lamina.

♂ and ♀ Total length 11 mm.; body 8 mm.; pronotum 2 × 3 mm.; tegmina 9·5 mm.

23. **Margattea aurea** n. sp.

Pulau Tello, Batu Islands, 1 ♂ ♂; Siberut, 3 ♀.

♂. Golden orange.—Head exposed, orange; eyes moderately far apart; antennæ exceeding the tegmina, first two joints orange, succeeding joints fuscous, lighter distally. Pronotum sub-ovoid, posteriorly slightly produced; disk orange, lateral margins broad, hyaline. Tegmina much exceeding the body; mediastinal area and outer portion of costal area hyaline, almost colourless, remainder pale golden orange, radial vein simple, 9 costals, the first seven simple, the 8th multi-ramose, the 9th bifurcate, 8 longitudinal discoidal sectors, 5 anals. Wings with the costal portion deep golden orange; all veins, from the mediastinal to the 1st axillary, golden orange, the other axillary veins fuscous: mediastinal vein bifurcate, the inner branch bifurcating once more and reaching much beyond the middle of the anterior border, radial vein simple; 6 costals, the first three simple, their ends incrassated, the last three ramose, not incrassated, median vein simple, only slightly sinuous, ulnar 5-ramose; apical triangle only moderate; 1st axillary 4-ramose. Abdomen below dull orange. Supra-anal lamina narrow, transverse. Sub-genital lamina transverse, twice as broad as long. Cerci unusually long, deep orange. Styles short, stout. Legs testaceous to orange, strongly armed: front femora proximally with a few large spines, followed distally by a series of piliform spines (type B).

♀. Similar to the ♂, but the wings without the golden orange, only the incrassated ends of the costals pale orange.

	♂	♀
Total length	17 mm	17 mm
Body	11 mm.	12·5 mm
Pronotum	3 × 4 mm	3·5 × 4·5 mm
Tegmina	14 mm	13 mm

24. **Margattea maculata** n. sp.

Siberut, 3 ♂ ♂, 2 ♀ ♀; N. Pagi, 1 ♂, 1 ♀.

♂. Head exposed, testaceous, with a dark macula on the forehead between the eyes; antennæ exceeding the tegmina, fuscous, basal joints testaceous. Pronotum sub-oval, disk testaceous, with dark brown vermiculations, reminding of *M. (Phyllodromia) nimbata* Shelf., but more complicated; lateral margins broad, hyaline. Tegmina much exceeding the abdomen, pale testaceous to hyaline, with three small, dark blotches, *viz.* one just outside the anal sulcus, a second near the centre of the tegmen, a third on the front margin near the apex; 11 costals, the first nine simple, the 10th bifurcate, the 11th multi-ramose; 5 longitudinal discoidal sectors, 5 anals. Wings hyaline, slightly fuscous; mediastinal vein bifurcate; 9 costals, the first five with their ends incrassated, silvery in colour, forming a whitish transparent patch; the 6th and 7th costals not incrassated, dark fuscous, the 8th bifurcate, the 9th multi-ramose; median vein simple; ulnar multi-ramose, cross venules strongly marked; apical triangle present; 1st axillary with 5 branches. Abdomen above almost black; below testaceous, fuscous towards the middle. Supra-anal lamina large, rounded, entire. Cerci very long, testaceous. Styles symmetrical, testaceous. Legs testaceous; front femora on the anterior margin with 6 large spines, followed at the extreme end by a series of very minute piliform spines (type B.).

♀. Similar to the ♂. Supra-anal lamina narrow, entire. Sub-genital lamina ample, rounded, dark testaceous.

♂ and ♀. Total length 11·5 mm.; body 8 mm.; pronotum 2 × 3 mm.; tegmina 9 5 mm.

The dark maculæ on the tegmina are not always equally well marked; this first of them, close to the anal sulcus, seems constant, but of the other two, one or both may be absent. However, the silvery patch just beyond the middle of the front margin of the wings seems constant and very characteristic.

Closely allied to *M (Phyllodromia) anceps* Krauss, from Sarawak and the Malay Peninsula. Differs by its smaller size, the smaller number of discoidal sectors, and the silvery patch in the costal margin of the wings.

25. **Margattea vermiculata** n. sp.

Siberut, 3 ♀♀.

♀ Small.—Head slightly exposed, vertex castaneous, front testaceous, with a few indistinct darker cross bars; eyes far apart; antennæ fuscous Pronotum large, sub-oval, broadest behind the middle, posterior margin almost straight; disk testaceous, with fuscous vermiculations; lateral margins broad, hyaline. Tegmina just exceeding the body, semi-hyaline, pale testaceous, costal margin broad, 11 costals, 5 longitudinal discoidal sectors, anal sulcus well marked, 4 anals. Wings infuscated, mediastinal vein simple, radial vein simple, straight, 7 costals, of which the 5th is bifurcate, the 7th ramose, the first five terminally incrassated; median vein simple, straight; ulnar vein 4-ramose; apical triangle present; 1st axillary 5-ramose Abdomen below testaceous with broad black lateral margins, centre of sternites darker. Supra-anal lamina rounded, entire. Sub-genital lamina ample, black for the greater part. Cerci (mutilated) fuscous. Legs pale testaceous; front femora with two large spines, followed by a long series of minute piliform spines (Type B.); hind femora weakly spined.

♀. Total length 9 mm.; body 8 mm.; tegmina 6·8 mm.

26. Chorisoblatta megaspila Walker.

Blatta megaspila Walker, Cat. Blatt. B. M., p. 98 (1868).

Hitherto recorded from Java and Sarawak only, but also occurs on the Malay Peninsula, *viz.* Kuala Tahan, Pahang (H. M. Pendlebury, Dec. 1921), and Batang Padang, Perak, 1,800′ (do., June 1923).

27. Chorisoblatta diagrammatica Hanitsch.

Phyllodromia diagrammatica Hanitsch. Trenbia, Vol. III, pp. 198—200, fig. 1 (1923); Journ. Mal. Br., R. A. S., Vol. I, pp. 404—406, figs. 6—8 (1923).

Siberut, 3 ♂ ♂, 1 ♀.

The oblique discoidal sectors of the tegmina, ten in number, and the armature of the front femora after type B, bring this species under the present genus. I first described this insect from an example of doubtful origin in the Buitenzorg Museum, but have since recorded it from Singapore and Kuala Lumpur. It also occurs in Sumatra, *viz* Pakan Baroe (I. B Corporaal, Dec. 1919), and Medan (E. Mjöberg, 1919—1921).

The one ♀ from Siberut bears an ootheca, suture uppermost.

28. Chorisoblatta karnyi n. sp. (pl. I, fig. 8).

Siberut, 1 ♀.

♀. Large, marmorate.—Head much exposed, testaceous, on the occiput a longitudinal broad black streak, narrowing on the vertex, widening out again on the forehead and spreading out into a black patch with 5 short finger-like processes; from the antennal sockets downwards another broad irregular streak, ending in the labrum; eyes one-third the width of the head apart; antennæ (partly mutilated) rufous. Pronotum broad, sub-oval, greatest width behind the middle, anterior border straight, posterior border almost so; disk testaceous, with an intricate design in black and white (*see* pl. I, fig. 8); lateral margins very broad, hyaline; posterior border narrow, black. Tegmina much exceeding the abdomen, broad; mediastinal area broad, hyaline, whitish; remainder of the tegmina also hyaline, whitish, but everywhere, except in the proximal and anterior part of the costal area, with closely packed masses of small brown patches which may be square, oblong or irregular, the total producing a dead-leaf like appearance; 10 costals, the first seven simple and strongly marked in brown, the others ramose, thin, white; about 11 oblique discoidal sectors; anal sulcus well marked, with brown lines on either side; 7 anals. Wings slightly fuscous, veins stout, castaneous; mediastinal vein long, bifurcate, reaching to the middle of the costal border; radial vein bifurcate at ⅔ from its origin; 7 costals, the first six simple, clavate, the 7th ramose; posterior branch of the radial also ramose; median vein simple, slghtly sinuous; ulnar vein multi-ramose; apical triangle moderate; 1st axillary 4-ramose. Abdomen above dark fuscous to black, shining; below deep black, each segment with a pair of large, sub-marginal fulvous patches, and a narrow, whitish border. Supra-anal lamina rounded. Sub-genital lamina ample, round, fulvous, with a large central dark patch. Cerci long, with unusually long setæ, dark brown to black, lighter in the middle. Coxæ testaceous; femora black above, testaceous below; tibiæ with alternatina black and white cross bands; anterior femora proximally with a few large spines, followed distally by a series of minute piliform spines (type B).

♀. Total length 18 mm.; body 13.5 mm.; pronotum 4 × 6 mm.; tegmina 14 mm

Allied to *Blatta polygrapha* Walker, from Chantabun, Siam, the type (♀) of which is in the Oxford Museum, and to *Blatta megaspila* Walker, of which this Museum contains an example from Sarawak which Shelford had compared with the type, from Java, in the British Museum. Both these species have now to come under *Chorisoblatta* But though *C. megaspila*, and still more *C. polygrapha*, show a striking similarity to *C. karnyi* in the markings both of the pronotum and of the tegmina, yet *C. polygrapha* is readily distinguished by the markings of its head which run transverse, not longitudinal as in *C. karnyi*, whilst in *C. megaspila* we find two narrow longitudinal lines on the occiput which join on the vertex and are continued down the face as a broad chestnut band with irregular outlines.

29. **Liosilpha angustior** n. sp

Pulau Tello, Batu Islands, 5 ♂ ♂, 13 ♀ ♀; Sipora, 2 ♂ ♂, 10 ♀ ♀.

♂. Head somewhat exposed, orange, three longitudinal darker lines on the vertex, a few indistinct bands across the face; eyes moderately far apart; antennæ much exceeding the body, testaceous. Pronotum broad, sub-oval, posterior margin slightly produced; disk dull orange, with a few dark scattered spots; lateral margins broad, hyaline. Tegmina exceeding body and cerci, pale testaceous, sub-hyaline, costal area broad, nearly one half the width of the tegmen; 11 costals, the 10th and 11th ramose; 6 longitudinal discoidal sectors; anal sulcus faintly orange, 5 anals. Wings hyaline, mediastinal vein bifurcate, ends swollen; 8 costals, the 7th and 8th ramose, the first six terminally much swollen; median vein simple, straight; ulnar vein ramose, ending in 6 branches; apical triangle conspicuous; 1st axillary 4-ramose. Abdomen above testaceous, with fuscous blotches, below testaceous, with a large black central blotch. Supra-anal lamina triangular. Sub-genital lamina ample, rounded, testaceous, with a central, elongated darker blotch. Cerci dull orange, with black markings. Two styles, symmetrical. Legs testaceous; front femora with the proximal ⅓ of the anterior border bare, remainder with comparatively large spines which decrease in size distally (type A); posterior femora strongly armed.

♀. Similar to the ♂. Supra-anal lamina rounded, entire. Sub-genital lamina ample, rounded, testaceous, with a large black macula of varying shape, Λ or Λ or Λ.

		♂	♀
Total length	..	14 mm	10 5 mm
Body	...	11 mm	7 5 mm.
Pronotum	...	3 × 4 mm.	3 × 4 mm
Tegmina	..	11 5 mm.	8 mm

Differs from *L. lata* mihi, from Sarawak and the Malay Peninsula, by being much less broad, the pronotum measuring only 4 mm in width, as against 6 mm. in *L. lata*

There is only little necessity for the genus *Luosilpha* The longitudinal discoidal sectors of its tegmina, and the armature of its front femora after type A should bring it under *Neoblattella* Shelford

30. Pseudophyllodromia laticeps Walker.

Blatta laticeps Walker, Cat. Blatt. B. M., Suppl., p 142 (1869).

Pulau Tello, Batu Islands, 1 ♂. Siberut, 15 ♂ ♂, 4 ♀ ♀; Sipora, 5 ♂ ♂. 5 ♀ ♀; N. Pagi, 1 ♂, 1 ♀.

Recorded from the Malay Peninsula, Borneo and Sumatra, but not yet from Java.

EPILAMPRINÆ

31. Homalopteryx karnyi n sp. (pl. II, figs. 1 and 2)

North Pagi, 3 ♂ ♂, 5 ♀ ♀; Siberut, 3 ♀ ♀; Sipora, 4 ♂ ♂, 1 ♀.

♂. Head covered; occiput castaneous, vertex testaceous, front testaceous, with an urn-shaped chestnut marking; antennæ equalling the body, fuscous. Pronitum large, anterior margin parabolic, posterior margin sub-truncate, slightly sinuous; centre of disk reddish testaceous, behind and at the sides enclosed by a broad black line, in front by a diffused castaneous blotch; lateral margins hyaline, with large, dark orange dots. Tegmina as long as the abdomen, pellucid testaceous, with a few irregular brownish maculæ chiefly along the ulnar vein; serio-punctate, the punctures in the anal area being especially large and margined with brown. Wings hyaline, with a few dark maculæ near the apex. Abdomen below testaceous, heavily mottled with black, except at the sides Supra-anal and sub-genital laminæ both slightly bilobate. Cerci and styles symmetrical, testaceous. Legs reddish testaceous, heavily spined;

posterior metatarsus somewhat shorter than the succeeding joints, spined, the pulvillus occupying one-third its total length; remaining tarsal joints unarmed; arolia present.

♀ differs from the ♂ by its larger size and by the tegmina being truncate, reaching to the middle of the 2nd abdominal segment only; wings much reduced, only 4 mm. in length, venation obscure; supra-anal lamina bilobate, sub-genital lamnia entire.

		♀	♂
Total length	...	25 mm.	28 mm.
Pronotum	...	7 × 9·5 mm.	8·2 × 11 mm.
Tegmina	...	19 mm.	8 mm.

The Oxford Museum contains an example, ♀, of a closely allied species, not named, from Kalim Bungo, Nias, collected by R. Mitschke, 1896, and acquired from van der Poll It differ from *H karnyi* as follows disk of the pronotum black throughout; tegmina at their apex rounded, not truncate, and reaching to the middle of the 4th abdominal segment, and coloured rufous chestnut, except at the costal margin and at the apex; total length 29 mm; pronotum 8 5 × 13 mm., tegmina 13 mm. I propose for this species the name of

Homalopteryx mitschkei n. sp.

32. Pseudophoraspis nebulosa Burmeister.

Epilampra nebulosa Burm. Handb. Entom., Vol. II, p. 505 (1838).

Pulau Tello, Batu Islands, 3 ♂ ♂, 1 ♀; Siberut, 3 ♀ ♀; Sipora, 6 ♀ ♂, 6 ♀ ♀; N Pagi, 2 ♂ ♂, 1 ♀; Padang, 1 ♂.

Common throughout the Malaysian sub-region.

33. Rhabdoblatta procera Brunner.

Epilampra procera Brunner Syst. Blatt , p. 192 (1865).

Siberut, 1 ♂.

Brunner's description of the ♀ only may be supplemented by that of the ♂, from Siberut, as follows:

♂. Considerably smaller than the ♀ — Head exposed, testaceous, vertex finely impresso-punctate; eyes moderately far apart; antennæ fuscous, reaching nearly to the apex of the tegmina. Pronotum sub-oval, much produced behind, greyish—testaceous, densely impresso-punctate, with a narrow testaceous border. Tegmina exceeding the abdomen by ¼ of their length, narrow, rufo-testaceous, clouded with castaneous, impresso-punctate chiefly in the mediastinal and anal areas Wings testaceous, costal margin and apex suffused with castaneous. Abdomen above flavo-testaceous, below with a few scattered black spots in addition. Supra-anal lamina bilobed, sub-genital lamina rounded, twice as broad as long. Cerci black. Styles yellowish, somewhat asymmetrical, the left nearer to the middle line. Legs flavo-testaceous; front femora with 4 stout spines on the anterior margin followed by about 8 minute piliform spines 5 stout spines on the posterior margin, mid and hind femora both with 3 spines on the anterior margin, 4 on the posterior.

♂. Total length 26 mm.; body 19 mm.; pronotum 5 x 6 mm.; tegmina 22 mm.

Distribution—Tis species had curiously enough so far been recorded from Java, Borneo, Sumatra and Nias only, though it is common throughout the Malay Peninsula. The British Museum contains specimens from Singapore (H N. Ridley, 1897) and Batu Pahat, Johore (H. N. Ridley, 1901), whilst in collections from the F. M. S Museums I have seen examples from the following localities Changkat Mentri, Bernam, Perak (C. B Kloss, Sept. 1918), Ampang Forest Reserve, Selangor (H. C. Abraham, Oct. 1920), Gunong Tahan, 3,300′ (J. Bangga, Nov 1920), Kuala Tahan, Pahang (H M. Pendlebury, Nov. 1921), Nakon Sri Tamarat, Klawng Tadi, Peninsular Siam (H M Pendlebury, April 1922), and Kuala Lumpur (E. Seimund, Feb. 1924).

34. **Epilampra lyrata** Hanitsch (pl. II, fig. 3).

J Malayan Branch, R. A. S., Vol. I, p. 430 (1923).

Pulau Tello, Batu Islands, 3 ♂ ♂ ; Siberut, 5 ♂ ♂ , 9 ♀ ♀ ; Sipora, 2 ♂ ♂ , 4 ♀ ♀ ; N. Pagi, 5 ♀ ♀ .

The type (♀) of this species came from Gunong Angsi, Negri Sembilan. As the present collection contains examples of both sexes, I can add the description of a ♂.

♂. Smaller than the ♀ —Head exposed, its testaceous ground colour much obscured by black markings, *viz.* on the vertex by 4 broad longitudinal lines, the two median ones uniting on the face to form a large black patch which below the antennary sockets spreads out on either side in semi-lunar fashion; eyes far apart; antennæ much exceeding the body, dull castaneous. Pronotum parabolic in front, produced behind; disk light castaneous, with diffused black blotches (in the type ♀, from Negri Sembilan, roughly in the shape of a lyre); anterior and lateral margins broad, orange-testaceous, with numerous black dots and blotches Tegmina exceeding the abdomen by ⅓ their length, deep castaneous, with lighter ocelliform spots chiefly along the costal margin and apex. Wings with the anterior portion deep orange, with blackish blotches near the apex; posterior portion fuscous, veins orange. Abdomen below testaceous, thickly spotted with black. Supra-anal lamina large, rounded, slightly bilobed Sub-genital lamina rounded, entire, twice as broad as long, dark castaneous. Cerci testaceous, tips black. Styles symmetrical, testaceous. Legs very light castaneous, mid and hind coxæ spotted with black; front femora on the anterior margin with 5 large spines, followed by a close series of piliform spines; posterior margin with 4 large spines, mid and hind femora with 4 spines both on the anterior and the posterior margins; all genicular spines present; posterior metatarsus much longer than the remaining joints taken together, spined throughout its length; second and third tarsal joints also spined

♂. Total length 24 mm., body 21 mm.; pronotum 6 × 7 mm.; tegmina 20 mm.

♀ (both Negri Sembilan and Mentawi) total length 28 mm., body 25 mm.; pronotum 6.5 × 8 mm.; tegmina 23 mm.

Distribution. Besides Mentawi Is. and Negri Sembilan, also Kota Tinggi, Johore (1 ♀, V. Knight, August 1917).

35. **Epilampra communis** n. sp.

Pulau Tello, Batu Islands, 4 ♂♂, 2 ♀♀; Siberut, 57 ♂♂, 98 ♀♀; Sipora, 41 ♂♂, 112 ♀♀; N. Pagi, 10 ♂♂, 22 ♀♀. A total of 346 specimens!

♂. Rusty orange.—Head exposed, testaceous, three or four longitudinal, broken, chestnut lines on the vertex, and scattered chestnut dots on the face, eyes far apart, antennæ testaceous, reaching to the apex of the tegmina. Pronotum parabolic in front, produced and angulate behind, lateral margins slightly inverted; smooth, testaceous, closely spotted with small and large chestnut dots, a more regular row of large spots along the posterior margin. Tegmina exceeding the body by ¼ of their length, in transmitted light very pale testaceous, with numerous large and small rusty orange blotches, a series of darker irregular spots along the costal margin, mediastinal and anal areas impresso-punctate, remainder of tegmina with only faint punctures; 11 costals, anal sulcus reaching to 2/5 of the length of the sutural margin; about 10 anal veins. Wings hyaline, veins orange, costal margin opaque. Abdomen below orange testaceous, with small, scattered chestnut dots. Supra-anal lamina bilobed. Sub-genital lamina large, triangular, a sinus on either side from which the styles arise. Cerci orange, with black tips. Styles orange. Legs orange testaceous, mid and hind coxæ with small chestnut dots; front femora with 4 spines in the middle of the anterior margin, distally followed by a series of minute piliform spines; posterior margin with 3 spines. Posterior metatarsus much longer than the succeeding joints, spined in its total length; 2nd and 3rd tarsal joints also spined.

♀. Larger and darker than the ♂, especially the abdomen below much darker, with numerous small and large black spots. Eyes even further apart than in the ♂.

		♂	♀
Total length	...	25 mm.	28 mm.
Body	...	19 mm.	23 mm.
Pronotum	...	5·5 × 6·5 mm.	7 × 8 mm.
Tegmina	...	20 mm.	24 mm.

Closely allied to *E. intermedia* mihi, from Sarawak, of which, howevere, I known the ♀ only. (Sarawak Mus. J., Vol. III, p. 95 (1925)). The Sarawak form is readily distinguished by the two black blotches on its face, one between the lower half of the eyes, and the other between the antennal sockets and the labrum. Also the underside of the abdomen is much darker there than in *E. communis*.

Also allied to an unnamed species from Kalim Bungo, Nias (R. Mitschke, 1896), of which the Oxford Museum contains 5 ♀ ♀ examples. However, the Nias form (♀) is lighter in colour than the ♀ of *E. communis*, in fact, it shows quite the rusty orange tint of the ♂ of the latter species.

36. **Epilampra mentawiensis** n. sp. (pl. II, fig. 4).

Siberut, 2 ♀ ♀ ; Sipora, 2 ♀ ♀ ; N. Pagi, 1 ♂.

♂ Large, castaneous.—Head exposed, dull testaceous, a large squarish blotch of dark castaneous on the upper part of the face, eyes far apart; antennæ exceeding the tegmina, dull castaneous Pronotum with the anterior margin parabolic, posterior margin produced and obtusely angled; smooth in front, with a few transverse corrugations; disk shining, uniform dark castaneous, lateral margins dark orange, spotted with castaneous Tegmina exceeding the abdomen by about 1/7 of their length; rufous castaneous, with pale ocelliform spots; mediastinal area pale orange, spotted; remainder impresso-punctate, most so in the anal area, the punctures disappearing towards the apex of the tegmina. Wings orange, costal area deep orange. Abdomen below uniform reddish castaneous. Supra-anal lamina bilobed. Sub-genital lamina ample, triangular. Cerci dull orange. Styles large, yellowish, semi-transparent. Legs castaneous, front femora on the anterior margin with 5 stout spines; followed by a series of minute piliform spines; 3 spines on the posterior margin; mid and hind femora with 3 spines on the anterior margin, 4 on the posterior; posterior metatarsus longer than the remaining joints, spined to nearly its end, pulvilli small; 1st and 2nd tarsal joints also spined

♀. Similar to the ♂, slightly larger. Supra-anal lamina bilobed. Sub-genital lamina ample, rounded.

		♂	♀
Total length	...	44 mm.	47 mm.
Body	...	38 mm.	40 mm.
Pronotum	...	10 × 13 mm.	11 × 14 mm
Tegmina	...	35 mm.	39 mm.

Allied to *E. ridleyi* Kirby, from Singapore, and *E. sarawacensis* Shelford, from Borneo and the Malay Peninsula. The former is of the same size (*viz.* ♀ 47 mm.), but its head is brownish chestnut above, passing into yellowish tawny below, and its pronotum is reddish brown, darker in the centre, with black, shallow punctures.

E. saravacensis is somewhat larger (♀ 56 mm.), its head is uniform rufo-castaneous and the pronotum dull orange, closely spotted with rufo-castaneous.

37. Rhicnoda rugosa Brunner.

Ann Mus. Genova (2), Vol. XIII, p. 31 (1893).

Pulau Tello, Batu Islands, 1 ♀; Siberut, 10 ♂ ♂, 3 ♀ ♀. Sipora, 6 ♂ ♂; N. Pagi, 7 ♂ ♂.

Common in all parts of the Malaysian sub-region, also recorded from Pegu, Tenasserim and Halmahera. None of the numerous ♂ ♂ of the collection show a trace of tegmina and wings, nor do so the exomples in the Oxford Museum, nor the various other collections I have examined. I regard this species as entirely apterous, though Shelford in "Genera Insectorum", Epilamprinæ, p. 9, defines the genus as with "tegmina and wings fully developed in ♂".

BLATTINÆ

38. Dorylæa flavicincta de Haan.

Periplaneta flavicincta de Haan Temminck, Verh Orth, p. 50 (1842).

Siberut, 1 ♂, 2 ♀ ♀.

Known from all parts of the Malaysian sub region, also from Formosa and Madagascar.

39. Dorylæa pallipalpis Serville.

Kakerlac pallipalpis Serville Hist. Nat. Ins., Orth., p. 71 (1839).

Periplaneta pallipalpis Brunner. Syst. Blatt., p. 238 (1863) Saussure. Mém. Soc. Genève, Vol XX, p 262 (1869)

Methana pallipalpis Kirby. Syn. Cat. Orth., Vol. I, p. 136 (1904).

? *Methana pallipalpis* Shelford. T. E. S, 1909, p. 309; Gen Ins. fasc. 109, p 11 (1910).

Methana pallipalpis Hanitsch. J. Straits B., R. A S., No 69, p. 100 (1915); J Malayan B, R. A. S., Vol. I, p. 434 (1923); Sarawak Mus. J., Vol. III, p 94 (1925)

Sipora, 1 ♀.

As I have pointed out in J. Malayan B., R A. S., Vol. I, p. 434, the proper place of this species is under *Dorylæa* Stâl, though Kirby, and Shelford doubtfully so, had referred it to *Methana* Stal. *Methana* has the posterior metatarsus spined beneath, and shorter, or not longer, than the remaining joints which are unarmed beneath, whilst in *Dorylæa* the posterior metatarsus, also spined, exceeds the succeeding joints in length, of which the second is armed, and the third unarmed.

The single ♀ from Sipora may be described as follows:

♀. Head exposed, vertex piceous, shading into dark castaneous on the front; clypeus light castaneous; basal joints of labial palps shining black, terminal joint fusco-castaneous; eyes far apart; antennæ exceeding the tegmina, first 12 joints black, turning into rufous. Pronotum large, broad, shining castaneous, anterior margin parabolic, posterior margin slightly rounded. Tegmina broad and short, just exceeding the abdomen, but reaching to the middle of the cerci only; shining castaneous. Wings with the anterior part yellowish in the front margin, rest fuscous. Body below dark castaneous; posterior border of 7th abdominal segment in either side with a depression. Supra-anal lamina triangular, its centre with a deep, oval incision. Valves shining black, punctured. Cerci long and broad, shining black. Legs castaneous, strongly armed; posterior metatarsus exceeding the remaining joints in length, armed; 2nd tarsal joint armed, equal in length to the 3rd and 4th combined, which are not armed (left hind leg with 5 tarsal joints, right with 4 only).

♀ Total length 22 mm.; body 21 mm.; pronotum 7·5 × 9·5 mm.; tegmina 15·5 mm.

Distribution. The whole of the Malaysian sub-region, also Talaut, Ceram and Australia.

40. **Periplaneta australasiæ** Fabricius.

Blatta australasiæ Fab. Syst. Ent., p. 271 (1775).

Sipora, 6 ♂ ♂, 4 ♀ ♀, and 2 ♂ ♂ larvæ.

Cosmopolitan.

41. **Periplaneta montana** Hanitsch.

Journ., Malayan Branch, R. A. S., Vol. I, p. 440, figs. 25 and 26 (1923).

Pulau Tello, Batu Islands, 1 ♂; Siberut, 2 ♂ ♂; Sipora, 5 ♂ ♂ 5 ♀ ♀; N. Pagi, 1 ♂.

I first described this species from Gunong Kledang, Perak, 2,646′, and Bukit Kutu, Selangor, 3,457′, but have since seen examples from Kuala Teku, Pahang (F. M. S. Museums, 1920), Sungei Tengah, Lower Perak (H. C. Robinson and E. Seimund, Oct. 1921), Bukit Kutu, Selangor, 3,500′ (H. M. Pendlebury, April 1926), Wai Lima, Lampong, S. Sumatra (Karny and Siebers, Nov.—Dec. 1921), and Gunong Singgalang, Sumatra, 1,800 m. E. Jacobson, July 1925).

42. **Stylopyga picea** Brunner.

Periplaneta picea Brunner. Syst. Blatt., p. 223 (1865).

Siberut, 1 ♂, 2 ♀ ♀; Sipora, 1 ♀.

This species has a wide range: Nicobars, Lower Siam, Malay Peninsula, Singapore, Borneo, Verlaten I., Krakatau; Also Padang, in W. Sumatra (Berlin Museum, S. G. Schoede, Dec. 1908), though not yet recorded from Java.

43. Stylopyga atrox n. sp. (pl. II, fig. 5).

Sipora, 1 ♀.

Entirely black, shining.—Head exposed, eyes far apart, antennæ black, fuscous towards the end. Pronotum large, anterior margin parabolic, posterior margin truncate; with 3 faint depressions, *viz.* two near the posterior border, one in front of them. Metanotum with the posterior border deeply excised, lateral angles much produced backwards. Tegmina squamiform, meeting in the middle line and reaching to the posterior border of the first tergite; their sides rounded off, exposing the postero-lateral lobes of the metanotum; deeply punctured; anal sulcus prominent, anal veins faintly indicated. Wings absent. Tergites smooth, shining, only the 6th and 7th with fine punctures; posterior angles drawn out into spines which increase in size from before backwards. Supra-anal lamina (♀) sub-quadrate, a small median triangular portion not chitinised, pale, giving to the lamina a bi lobed appearance. Sternites smooth, shining. Cerci black, flattened, spatula-like. Legs black, only tarsus and claws castaneous, strongly armed, posterior tibiæ with spines on outer margin 3-seriately arranged; posterior metatarsus as long as, or only slightly shorter than the remaining joints, spined; 1st and 2nd tarsal joints also spined; pulvilli minute, arolia present.

♀. Total length 27 mm.; pronotum 9 × 12 mm.; tegmina, length 9 mm., width 7·5 mm.

Differs from *S. picea* Brunner and *S. semoni* Krauss chiefly by its tegmina which are twice as large, with the anterior border rounded off, posterior border straight.

44. Homalosilpha ustulata Burmeister.

Periplaneta ustulata Burm. Handb. Entom., Vol. II, p. 503 (1838).

Siberut, 3 ♂♂ larvæ.

Common throughout the Malaysian sub-region.

PANCHLORINÆ

45. Pycnoscelus surinamensis Linné.

Blatta surinamensis L. Syst. Nat. (ed. X), Vol. I, p. 424 (1758).

Pycnoscelus obscurus Scudder. Boston I. Nat. Hist., Vol. VII, p. 424 (1862).

Panchlora (sub-genus *Leucophæa*) *surinamensis* Brunner, Syst. Blatt., p. 278 (1865).

Leucophæa surinamensis auct.

Siberut, several ♂ ♂ and ♀ ♀ ; Sipora, ♂ ♂ and ♀ ♀ ; Padang, West Sumatra, ♂ ♂ and ♀ ♀ .

Ranging throughout the tropics both of the Old and the New World.—The name *Pycnoscelus* Scudder is now generally accepted in place of *Leucophæa* Brunner, being older by a few years.

CORYDINÆ

46. Homopteroidea nigra Shelford.

Trans. Ent. Soc., London, 1906, p 274.

Siberut, 1 ♀ .

Shelford first described this species from Kuching, Sarawak (type, ♀ , in the Oxford Museum), and recorded it later on also from Sumatra, from an example in the Paris Museum.—I. B Corporaal took a specimen which I have seen at Sibolangit, Sumatra, July 1920.

47. Ctenoneura aberrans n. sp. (pl. II, figs. 8 and 9).

Siberut, 1 ♀ ; 1 sex ?.

♀ . Head covered, dark castaneous, shining; eyes far apart; antennæ fuscous, setiferous. Pronotum sub-circular, hind border straight; strongly rugose, disk almost black, margins fuscous. Tegmina somewhat exceeding the abdomen, elongate; anterior border slightly rounded, posterior border nearly parallel to it; brown, lighter towards the apex; veins well marked, raised; mediastinal vein single, ending at about 2/5 of the anterior border; radial vein bifurcate from near its origin, outer branch single, inner branch with about 3 indistinct costals, reaching only to ¾ of the anterior border; ulnar with 4 branches, curving and sweeping forwards, the first three ending in the anterior border, the last in the apex; cross venules distinct, irregular; anal sulcus thin, sharply defined; anal veins few and indistinct. Wings broad, fuscous; mediastinal vein short, simple; radial vein slightly sinuous; costals not distinguishable, in their place a dark fuscous blotch; median vein simple, sinuous; ulnar sinuous, with 3 curved, parallel branches; hind portion of the wing much smaller than the front portion, first axillary bifurcate, remaining axillaries few (2 ?). Abdomen below dark fuscous. Sub-genital lamina transverse, lozenge-shaped. Cerci long, about 6 joints, fuscous. Legs pale testaceous.

♀ . Total length 4·5 mm.

I established the genus *Ctenoneura* for two species of *C. major* mihi, from Mt. Murud, in which the branches of the ulnar vein of the wings are comb-like arranged, after the pattern of *Euthyrshapha* Burmeister (Sarawak Museum Journal, Vol. III, p. 100 (1925)). The venation of the wings of *C. aberrans* agrees closely with that of the two species from Sarawak, except that the costals are much reduced and are replaced by two dark blotches. The venation of the tegmina, however, shows considerable difference. In the two Sarawak species the branching of the radial is normal, the costals, about 12, occupying the whole anterior portion of the tegmen up to the apex. The same vein is much reduced in the Mentawi species, the costals, 3 or 4, occupy only the middle portion of the anterior border, whilst the greater part of the tegmen is filled up by the branches of the ulnar, which sweep outwards and forwards.

A specimen I have here from Gunong Singgalang, W. Sumatra, 1,800 m. (E Jacobson, 1925) agrees more with two Bornean species

OXYHALOINÆ

48. Areolaria fieberi Brunner.

Syst Blatt, p. 260 (1865)

Sipora, 1 ♀.

Hitherto recorded from Java and Penang only, to which localities I can add Medan, Sumatra, where Dr Mjoberg took a ♂ (1919--1921).

49. Areolaria signata Shelford (pl. II, fig 7)

Trans. Ent. Soc., London, p. 273 (1906)

Siberut, 2 ♀ ♀ ; Sipora, 1 ♂, 1 ♀, N Pagi, 1 ♂.

Previously known from Borneo only, but since also taken at Lau Kahat, Sumatra, by I. B. Corporaal, Feb. 1918.

PERISHÆRINÆ

50. Perisphæria lucasiana Saussure and Zehntner.

Rev. Suisse Zool, Vol. III, p. 36 (1895).

Sipora, 1 ♂, 4 ♀ ♀ ; N. Pagi, 1 ♀.

So far recorded from Java and the Malay Peninsula only, but since taken by Dr. Karny and Mr. Siebers at Wai Lima, S. Sumatra, Nov.—Dec. 1921.

PANESTHINÆ

51. **Panesthia javanica** Serville.

Ann. Sci. Nat., Vol XXII, p. 38 (1831).

Siberut, 4 ♂ ♂, 2 ♀ ♀ ; Sipora, 3 ♂ ♂, 3 ♀ ♀.

Most of the specimens taken, both mature and larvæ, were of a darker colour than is usual in such from Sumatra and the Malay Peninsula.

Ranging throughout the Malaysian sub-region, Burma, Lower Siam, Cambodia and Philippines.

52. **Panesthia hilaris** Kirby.

A. M. N. H. (7), Vol. XI, p. 413 (1903).

Siberut, 1 ♂.

This is apparently only the third record of this species. The type, ♀, in the British Museum came from Sandakan, B. N. Borneo, whilst I took a ♂ at Changi, Singapore, August 1896 (*see* J., Malayan Branch, R. A. S., Vol. I, pl. XIII, fig. 13 (1923). Kirby describes the tegmina as "yellowish hyaline, the basal third and a spot in the middle of the costa of the right tegmen, corresponding to a stripe on the left tegmen not reaching the inner margin". For this description, with its obvious hiatus, the following might be substituted "tegmina with the basal third dark chestnut to black, followed by a broad fulvous vitta, distal half of the tegmina at first dark brown, towards the apex fading away into testaceous.—The ♂ from Mentawi differs from the ♀ type by being somewhat smaller, by distinct cornua on the pronotum, instead of rounded prominences, and by its colouring being more intense. The antennæ both of the ♂ and of the ♀ are marked by a subterminal yellow ring.

Total length of the ♂ type from Sandakan, 32 mm.; of the ♂ from Changi, Singapore, 30 mm.; of the ♂ from Mentawi 28.5 mm.

53. **Panesthia polita** Krauss.

Semon, Zool. Forsch. Austr. Mal. Arch., Vol. V, p. 754 (1903).

Sipora, 2 ♀ ♀.

Originally recorded from Tjibodas (Java) and Borneo. In J., Malayan Branch, R. A. S., Vol. I, p. 454 (1923), I described two Blattidæ, from Singapore and Perak respectively, under the names of *Dolichosphæria arcuata* and *D. deplanata*. Both will probably have to be merged in the present genus and species. *Panesthia birmanica* Brunner, ♂, the type of which I have not seen, is apparently closely allied to this species. By the two small tubercles of its pronotum Brunner: ("tuberculis binis centralibus vix distinguendis") it seems to be neraest to *D. deplanata* mihi.

The two examples from Sipora measure 24 mm. and 22 mm. respectively, the smaller being somewhat reddish in colour.

Other material of this species I have recently had the opportunity of examining, includes: 1 ♂ from Fort de Kock, Sumatra, 920 m., (E. Jacobson, 1925); 2 ♀ ♀ from Sumatra (von Studt, ex Berlin Museum); 2 ♀ ♀ from Changkat Mentri, Bernam, Perak (C. Boden Kloss, Sept. 1918); 1 ♂ from Nakon Sri Tamarat, Peninsular Siam (H. M. Pendlebury, March 1922), several ♂ ♂ and ♀ ♀ in the British Museum, from Baram, Sarawak (Charles Hose, 1908).

OXFORD, 15*th November*, 1927.

LIST OF THE MENTAWI BLATTIDÆ WITH THEIR GEOGRAPHICAL DISTRIBUTION

	—	Mentawi Is.	Sumatra	Java	Borneo	Mal. Peninsula	Elsewhere
	Ectobinæ						
p	*Theganopteryx apicigera* Walker	×	×		×	×	
	Anaplecta javanica Saussure			×			
	Anaplectella smedleyi n. g. and sp.						
	Anaplectoidea saundersi n. sp.						
	Pseudomopinæ (= Phyllodromiinæ)						
p.	*Pseudothyrsocera rubronigra* Hanitsch	×	×			×	
	Ischnoptera klossi n. sp.						
	„ *nigra* n. sp.	×					
	Blattella germanica L.	×		×	×	×	Cosmopolitan
	„ *ridleyi* n. sp.					×	
	„ *tristis* n. sp.	×	×				
	Neoblattella irregulariter-vittata Brunner	×	×	×	×		
	Neoblattella hewitti Shelf., *fusca* n. sub-sp.		×				
	Neoblattella digitata n. sp.	×					
	„ *latimarginata* n. sp.	×					
	Margattea contigua Walker	×			×		Siam, N. Guinea, Kei Is.
	Margattea humeralis Walker	×	×			×	
	Margattea latius-vittata Brunner	×		×		×	Macassar

List of the Mentawi Blattidæ with their Geographical Distribution.—*Contd.*

	—	Mentawi Is.	Sumatra	Java	Borneo	Mal. Peninsula	Elsewhere
p. ...	*Margattea anceps* Krauss	×		×	×	×	
...	*Margattea nimbata* Shelford		×		×	×	Peninsular Siam
..	*Margattea argentea* n. sp.	×					
...	,, *aurea* n. sp ..	×					
...	,, *maculata* n. sp	×					
...	,, *vermiculata* n. sp.	×					
...	*Chorisoblatta diagrammatica* Hanitsch .	×	×	×		×	
..	*Chorisoblatta megaspila* Walker	×		×	×	×	
...	*Chorisoblatta kainyi* n. sp.	×					
...	*Laosilpha angustior* n. sp.	×					
..	*Pseudophyllodromia laticeps* Walker .	×	×		×	×	
Epilamprinæ							
p. ...	*Homalopteryx kainyi* n sp.	×					
..	*Pseudophoraspis nebulosa* Burm.	×	×	×	×	×	
...	*Rhabdoblatta procera* Brunner . ..	×	×	×	×	×	
...	*Epilampra lyrata* Hanitsch	×				×	
..	,, *communis* n. sp	×					
...	,, *mentawiensis* n. sp.	×					
...	*Rhicnoda rugosa* Brunner	×	×	×	×	×	Pegu, Tenasserim, Halmahera

List of the Mentawi Blattidæ with their Geographical Distribution—*Concld*

		Mentawi Is.	Sumatra	Java	Borneo	Mal. Peninsula	Elsewhere
Blattinæ							
p	*Doryloea flavicincta* de Haan						Formosa, Madagascar
	Doryloea pallipalpis Serville						Ceram, Australia
	Periplaneta australasiæ Fabricius						Cosmopolitan
	Periplaneta montana Hanitsch						
	Stylopyga picea Brunner						Nicobars
	,, *atra* n. sp.						
	Homalosilpha ustulata Burmeister						
Panchlorinæ							
I	*Pycnoscelus surinamensis* Linné						Cosmopolitan
Corydinæ							
p	*Ctenoneura aberrans* n. sp.						
	Homopteroidea nigra Shelford						
Oxyhaloinæ							
p	*Tricolana fieberi* Brunner						
	,, *signata* Shelford						
Perisphærinæ							
p	*Perisphæria lucasiana* Saussure and Zehntner						
Panesthinæ							
p	*Panesthia javanica* Serville						[illegible]
	,, *hilaris* Kirby						
	,, *polita* Krauss						

EXPLANATION OF THE PLATES

PLATE I

Fig. 1. *Anaplecta javanica* Saussure ♂. Left wing. × 10

Fig. 2. *Anaplectella smedleyi* n. g. and sp. ♂. Left wing. × 6.

Fig. 3. *Anaplectoidea saundersi* n. sp. ♂. Left wing. × 8

Fig. 4. *Anaplectoidea saundersi* n. sp. ♀. Left wing. × 8

Fig. 5. *Anaplectoidea saundersi* n. sp. ♂. Left tegmen. × 8

Fig. 6. *Ischnoptera nigra* n. sp. ♂. Left wing. × 5

Fig. 7. *Neoblattella digitata* n. sp. ♂. Pronotum. × 11

Fig. 8. *Chorisoblatta karnyi* n. sp. ♀. Pronotum. × 9

PLATE II

Fig. 1. *Homalopteryx karnyi* n. sp. ♂. × 1½

Fig. 2. *Homalopteryx karnyi* n. sp. ♀. × 1½.

Fig. 3. *Epilampra lyrata* Hanitsch. Front view of head. × 8

Fig. 4. *Epilampra mentawiensis* n. sp. ♂. Nat. size.

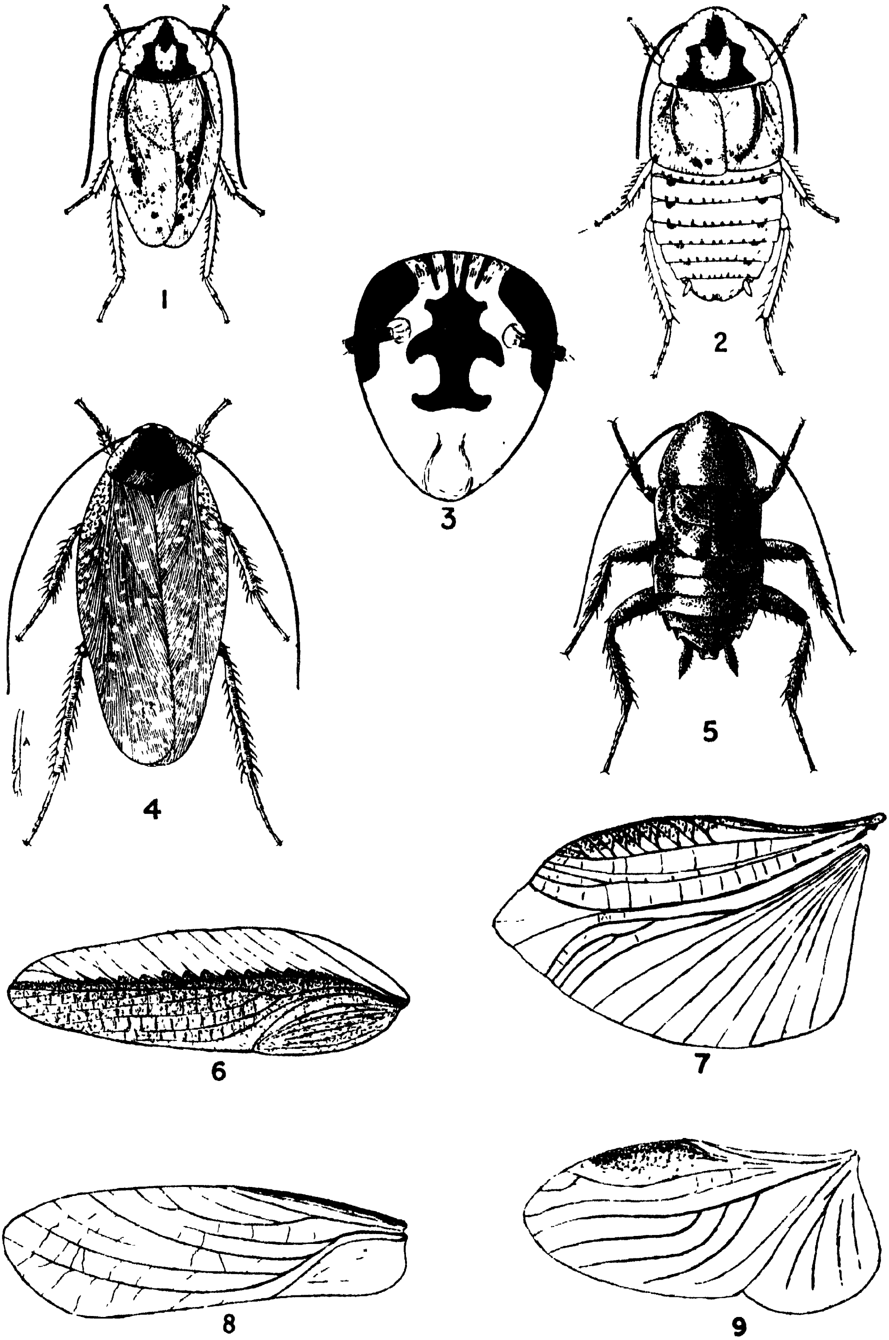
Fig. 5. *Stylopyga atrox* n. sp. ♀. × 1⅓.

Fig. 6. *Blattella ridleyi* n. sp. ♂. Left tegmen. × 9

Fig. 7. *Areolaria signata* Shelford ♀. Left wing. × 7

Fig. 8. *Ctenoneura aberrans* n. sp. ♀. Left tegmen. × 13.

Fig. 9. *Ctenoneura aberrans* n. sp. ♀. Left wing. × 13.



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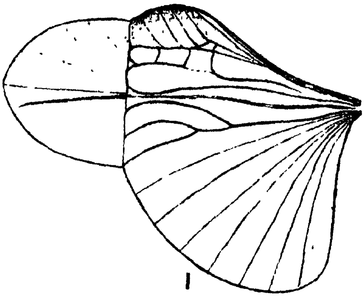
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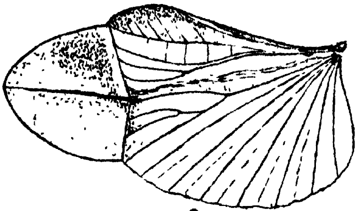
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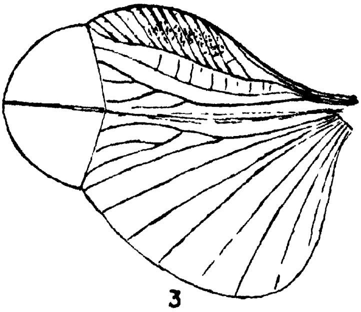
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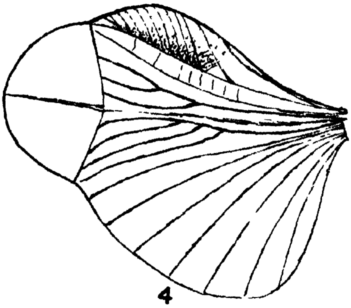
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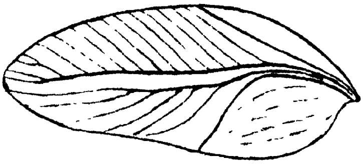
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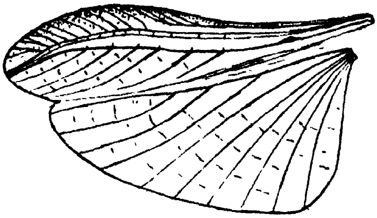
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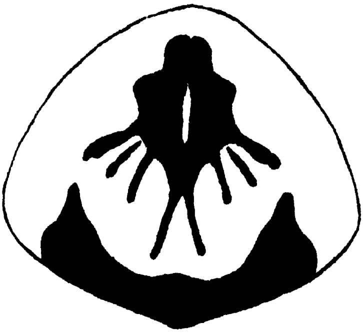
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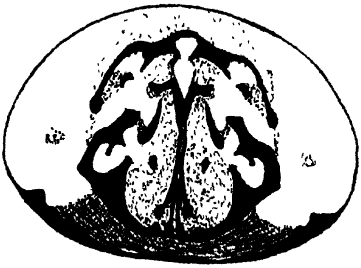
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R. HANITSCH: MENTAWI BLATTIDÆ

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The Zoo-geographical Boundaries between Asia and Australia and some Oriental Sub-Regions

by C. BODEN KLOSS, *F.R.G.S.*, *F.Z.S.*

(*with 4 text-maps*)

Zoologists who have been concerned with the faunas of the Eastern Archipelago have always felt much interest in the question as to where the Oriental Region ceases and the Australian Region begins; and many opinions, based on various grounds, have been advanced.

However the soundest method by which to arrive at a conclusion is to deduce it, if possible, from geographical facts; and when zoological appearances do not agree with geographical ones to regard the former as anomalous and endeavour to explain them.

Should we be able to trace through the islands one or more of the features which accompany the boundary of the Asiatic area where there is no question as to its limit we should obtain the solution of the problem.

If we look at a bathy-orographical map of this area we see that where the boundaries are clear-cut and distinct there occur several notable features, *viz*:—a chain of very great sea-depths parallelling an escarpment near which runs a chain of volcanoes outlining, on the whole, the continental plateau. The last is frequently extensively and deeply submerged and often embraces deep marine basins which are not boundaries in themselves.

Disregarding the Asiatic boundary farther north, the Philippine Islands possess many volcanoes, and running close to their eastern shores in the Pacific Ocean is the Mindanao Trough attaining a depth of nearly 6,000 fathoms: similarly in the south where volcanoes are also numerous there is the Java Trough, with a depth of 4,000 fathoms, stretching east and west in the Indian Ocean between the longitudes of Sumatra and Sumbawa[1].

---

[1] *Vide* map to illustrate Molengraaff's paper on "Modern Deep-sea Research in the East Indian Archipelago" in Geog. Journ., Feb. 1921, and the Diepzeekaart v. d. O.-Ind. Arch., compiled by the Royal Netherlands Geog. Soc., in the Atlas v. Ned. O.-en W. Indie, also published in De Zeeen v. Nederl. Oost-Indie, 1922.

Now if we join up the extremes of these two troughs by a line amongst the islands passing through the deep sea-basins between Mindanao and Sumbawa we should have the dividing line between the two continental areas and the boundaries of the Oriental and Australian zoological regions.

Starting from the Pacific Ocean and following the direction of the Mindanao Trough towards the south we find that the line trends northwards of Halmahera Island slightly towards the south-east; but if we continued in that direction we should soon be brought up by the shallow Sahul Shelf on which stand New Guinea and the islands off its north-western extremity, so we follow the arm of deep water running at a slight angle from the south end of the trough through the Molucca Passage between Halmahera and Celebes. South-westwards of Batchian Island it enters the Batchian Basin with depths of 2,500 fathoms. Proceeding southwards our line has to cross the very narrow submarine ridge between Obi Island and the Sula group (of which more later) to sink almost immediately into the very deep water of the Pitt Passage, which is an arm of the Banda Sea. It then turns abruptly westward and circling round Buru Island runs south of Amboyna and Ceram and north of Banda south-eastwards into the Banda Deep. Here are depths of more than 3,000 fathoms and this, the deepest basin within the Archipelago, lies near the mid-length of the dividing line.

Now we will proceed in the same manner to trace the line inwards from the Indian Ocean. The trend of the Java Trough leads to the Timor Sea, where there are depths of over 1,500 fathoms south of the island of that name; but if we continue onwards to the eastern extremity of this basin we are brought up against the bank which connects the Babar group, the Timor Laut group and the islands from Kei to Ceram with Australia and New Guinea. We must therefore turn northwards, either between Timor and Letti or Sermatta and Babar islands. The latter course seems preferable as by it we reach very shortly the south-west extremity of the 2,500 fathoms contour surrounding the Banda Deep and so onwards to join in that Deep the line from the north. In this way, too, we give to Asia the deepwater islands possessing none of the more notable elements of the Australian fauna.

It is however, in this locality that the line of division is least certain, for had we continued on southwards from the Banda Deep the trends of the latter would have taken us north of Timor through the Savu Sea (2,000 fathoms) and out across the ridge between that island and Sumba to join the Java Trough.

The volcanoes, which are the confirming feature of the division, accompany the line of depths on its western side in the Philippine

Islands and in the Sangir Islands, stretching between Mindanao and Celebes; on its eastern side (*i.e.* on the edge of the Australian Region) off the west coast of Halmahiera; and again on the western side from Banda Island through the Banda Arc and then westwards from Pantar Island through the Lesser Sunda Chain, Java and Sumatra.

Thus, with little exception, this chain of volcanic agency runs closely along the edge of Asia: it is almost parallel to the line of deepest depression and is probably to a considerable extent the cause of it.

The exceptions are where the volcanic area occurs on the Australian side, and through the gap between it and Banda Island (a volcano) much of the exchange of the present faunas of the Australian and Oriental Regions has taken place. The second point of exchange is the non-volcanic neighbourhood of Timor.

In three places only, *viz.*,—between the Sula group and Obi Island, between the Sermatta and Babar groups, and between south west Timor and Australia does the line traverse depths of less than 1,000 fathoms and we may regard these three ridges, all with least depths of considerably more than 500 fathoms, as the causeways, or stepping-stones, over which certain existing Papuan and Australian elements (*sensu stricto*) have entered the Oriental Region and fewer Asiatic ones have spread to the Australian area.

Up to a certain point the division between the two continental areas, or regions, is easy: by taking the 500 fathom contours as the boundaries of the plateaux Asia is given its farthest south-eastern extension while still retaining Australia as a disconnected area Celebes and the Lesser Sunda Islands as far as Wetter, are attached to Asia: Halmahiera, Obi, Ceram, Kei, Timor Laut and the Babar groups are Australian. The task is to allocate to one or the other of the continental areas the islands standing in deeper seas. The line that has been traced does this: it was first proposed by Pelseneer, on the basis of the distribution of the Vertebrata and Mollusca combined with the depths of the seas among the islands, and called by him "Weber's Line"[1] I have gone into the argument for drawing it and the reasons for its course at length because I had traced it also before I was acquainted with the details of Pelseneer's conclusions, in which, however, the division by sea depths is unsupported by the volcanic arguments.

Accepting the line as part of the boundary of the Oriental Region let us now divide the south-eastern portion of the latter into Sub-regions proceeding from that nearest the centre towards the periphery.

---

[1] Bull. Classe Sci (Acad. Roy. de Belgique), 1904, pp 1001—1022 and map La "Ligne de Weber" limite zoologique de l'Asie et de l'Australie: par Paul Pelseneer.

The first is a continental sub-region—the Indo-Chinese Sub-region, or Indochina, and we need only consider here its southern limits. It includes the islands of Formosa, Hainan, the Andaman group and many small islands near the coasts of the mainland, otherwise is bounded by the China Sea and the Bay of Bengal except in the Malay Peninsula where it extends to about Lat. 10° N.

Next comes the Malaysian Sub-region, or Malaysia, very closely allied to the last. This consists of the Malay Peninsula south of Lat 10° N., with all the islands of the Eastern Archipelago which stand on the Sunda Shelf—that great, little-disturbed, flat area of shallow sea-bottom which extends southwards from Indo-China having everywhere depths of less than 100 fathoms, and over the greater part of its expanse of even less than 40 fathoms. It embraces the Peninsula, Sumatra, Java, Bali, Borneo, Balabac, Palawan, the Calamianes and Cuyos Islands (the last four only politically Philippine) the smaller intervening islands and those adjacent to the shores of the others—in fact, all the land masses on the Sunda Shelf.

In Malaysia, however, must also be included the deepwater islands off the west coast of Sumatra, *i.e.*, the Simalur and Mentawi groups and Engano; also Christmas and Cocos-Keeling Islands. proximity alone in this case will place them with it, but we now know that they are allied to it by their biology though the latter is sufficiently peculiar to give cause to regard them as a distinct Malaysian province of equal value with the provinces of Sumatra, Borneo, etc.[1]

It is possible that the Nicobar Islands should also be included in Malaysia and in this province.

The Philippine Islands (other than those, politically Philippine only, included in Malaysia) and the Sulu Islands lie, like Malaysia, on a 100-fathom bank which stretches but a little distance beyond their shores. More distant from the continent to-day, longer separated from it, and more broken up, they form the Philippine Sub-region. It is distinguished from Malaysia and Indo-China not only by the peculiar forms it possesses, but also by the many genera which it lacks. Lying as it does outside the 100-fathom line surrounding the continent it exhibits in many respects an impoverished fauna; but, on the other hand, by isolation in deeper sea it has developed many endemic features. In that it lies within depths of 500 fathoms it is distinctly Asiatic. The connection with Malaysia has been *viâ* the Palawan and Sulu groups across the Mindoro and Sibutu Passages.

---

[1] *Vide* Kloss, P.Z.S., 1927, pp. 798–807 and map.

Within the 500-fathom line lies also Celebes with certain minor island groups off its eastern and southern peninsulas, and also the Sunda Islands from Lombok to Wetter with Sumba. Taking these for the nucleus and adding to it all the deeper-water islands between the Malaysian and Philippine Sub-regions and the limits of Asia, as indicated by Weber's Line, *viz.*:—the Sangir and Talaut groups north of Celebes, the islets in the middle of the Molucca Passage and in the Banda Sea, the Sermatta Islands, Timor, Rotti and Savu—we have the outermost Oriental Sub-region.

Most distant from the Asiatic mainland, its islands standing in considerable depths of sea, this Sub-region is the most distinct of all now discussed. It is much less homogenous than the others—there are considerable differences between Celebes, the Lesser Sunda Chain and the more isolated islands. Both the latter seem to be inhabited by a fauna largely immigrant, rather than one which has been locally evolved, and principally characterised by an absence of numerous species and by peculiar forms. The Lesser Sunda Islands are an eastern prolongation from Bali; the more direct connection of Celebes with Malaysia has been in a south-western direction from the Makassar peninsula towards Java. On the whole, though obscured by an Australian penetration, it is basically Oriental; therefore, I would call it the Austro-Oriental Sub-region, a term which clearly indicates its zoological nature.

Wallace's Line is not a regional division like Weber's Line, but is the dividing line between the Austro-Oriental Sub-region (whose other boundary is Weber's Line) and the more characteristically Oriental sub-regions, the Malaysian and the Philippine. Thus, though not of primary value it is of great importance, and is by no means to be ignored, or altered, or treated with the contempt which some authors have expressed for it. The two most external sub-regions, the Philippine and the Austro-Oriental, are notable in the Oriental Region for the absence of large mammals. Comparatively speaking, large mammals are only present on large land-masses: only small mammals occur on small land areas; and generally the species are then not numerous.

Map 1 shows the Sunda Shelf on which the sea depths are less than 100 fathoms and the islands which must be attached to it to form the Malaysian Sub-region. There is seen, too, part of the Sahul Shelf, of equal value and nature, north of Australia and also the isolated Philippine Bank.

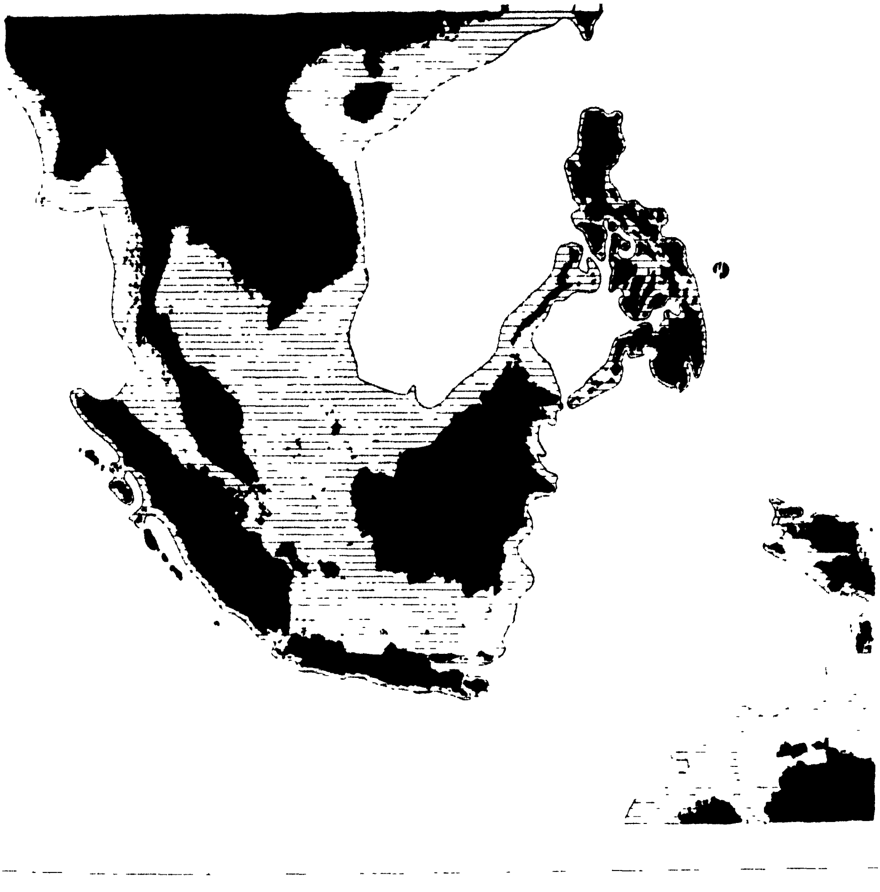
Map 2 shows the seas of less than 500 fathoms (extending from the present continents) which may be considered to cover the continental plateaux and indicate their limits; it shows also the deeper marine basins situated within them. On the Asiatic plateau lie (1) Malaysia, (2) the Philippine Sub-region surrounded by its 100-fathom contour line and divided from Indo-China and Malaysia by deeper water; and, separated from these truly Oriental sub-regions by Wallace's Line which is a sub-regional dividing line of great importance (3) the Celebesian area and the Lesser Sunda Chain, which are the major part of the Austro-Oriental Sub-region.

Map 3 shows by means of contour lines enclosing seas of less than 1,000 fathoms the possible causeways, or series of stepping-stones, situated where now occur sea depths of between 500—1,000 fathoms, across which the faunas of regions and sub-regions have inosculated. It shows a possible past northern connection between the Philippine sub-region and Indo-China as well as a southern one with Malaysia. It shows the non-volcanic Timor passage by which an Australian element has reached the Lesser Sunda Islands; the non-volcanic Obi-Sula passage by which Papuan forms have entered Celebes; and it indicates how, by means of the Sangir and, perhaps, Talaut stepping-stones which have made possible interchange between Celebes and the Philippines, some of these Papuan elements could further enter the latter We also see that there may have been possibly some movement between Flores and Celebes by way of the Kalao-Djampea and Salayer Islands.

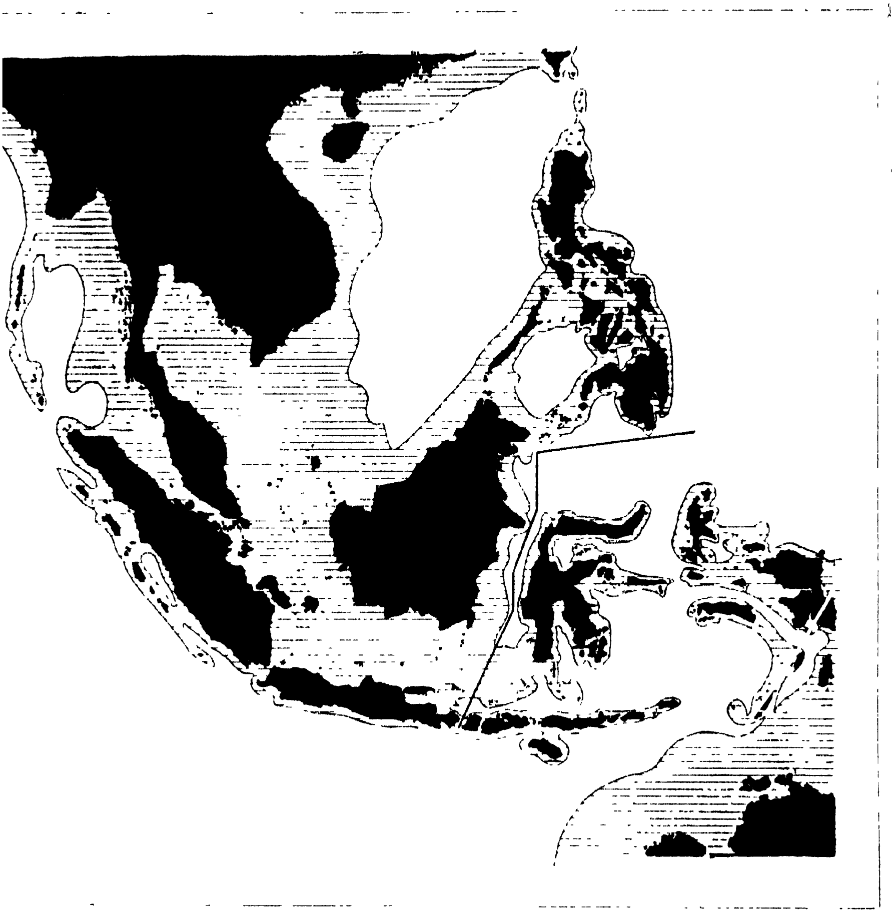
Map 4 shows Weber's Line (part of the dividing line between two Regions) and indicates the volcanic areas by which it is accompanied in parts. It shows also the neighbouring sub-regions.

In such conditions as these regions and sub-regions stood the perimeter of each will always show borrowings from its nearest neighbours.

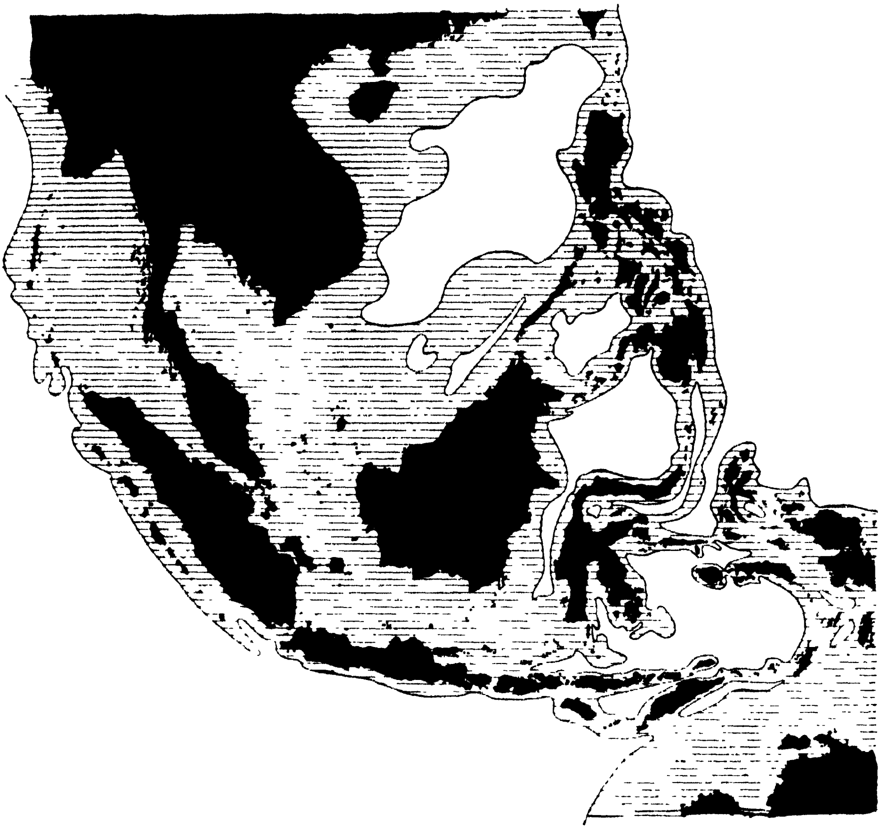
[The exact depths used for contour lines are purely arbitrary and are chosen for convenience: the lines, too, are somewhat approximate. I have carefully avoided use of the terms "Malay Archipelago, Indo-Malayan, Austro-Malayan" as zoologically they convey entirely false meanings (Indo-Malayan is of course quite good as against "Indo-Chinese": but there is practically no controversy here and contrasting terms are not required): and I confine the word "Malayan" to things pertaining to the Malay Peninsula (for which no other adjective is available) placing it on a par with Bornean, Sumatran, Javan, etc.]



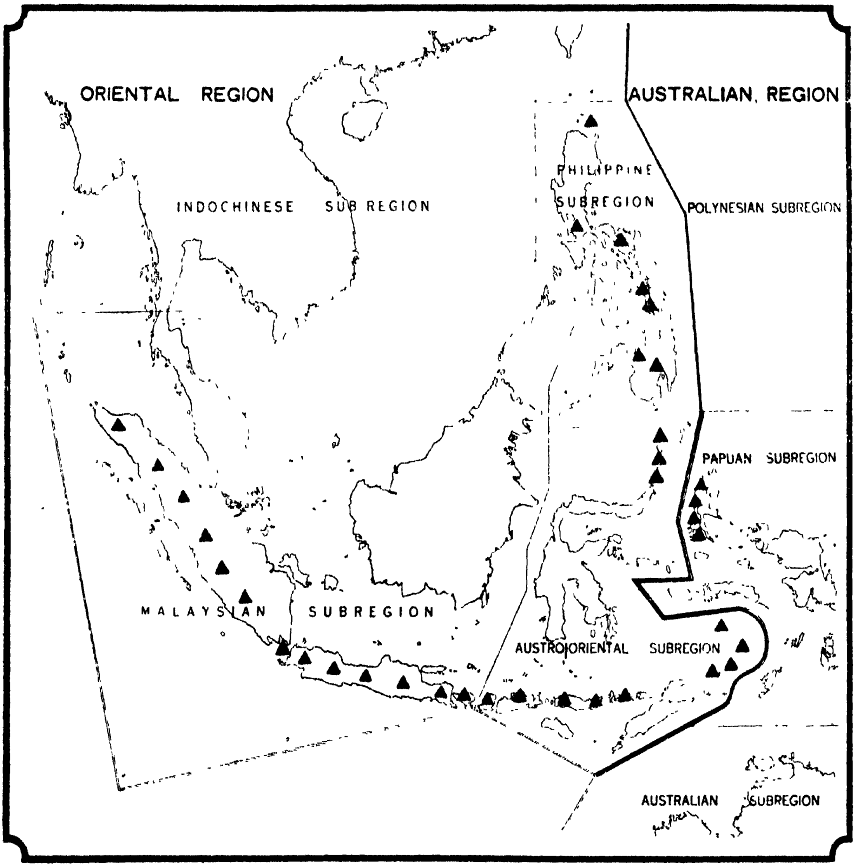
Map 1



Map 2



Map 3


ORIENTAL REGION
AUSTRALIAN. REGION
INDOCHINESE SUB REGION
PHILIPPINE SUBREGION
POLYNESIAN SUBREGION
PAPUAN SUBREGION
MALAYSIAN SUBREGION
AUSTRO-ORIENTAL SUBREGION
AUSTRALIAN SUBREGION

Map 4

Two New Races of Galeopterus

by F. N. CHASEN *and* C. BODEN KLOSS

Galeopterus variegatus terutaus subsp. nov.

Type.—Adult female, skin and skull collected on Terutau Island, West coast of the Malay Peninsula, on 25th December 1916 by H. C. Robinson; Federated Malay States Museums No. 264/17.

Diagnosis.—Size as in *pumilus*[1] and *aoris*[2] but the female with brownish patches on the shoulders Male nearest to *aoris* but, as a series, more rufous, and not so dark: more richly coloured than *pumilus*. The skull of the adult female resembles that of *pumilus* and differs from *aoris* in the more expanded zygomatic arches and broader interorbital space. Condylo-basal length of adult females, 59-63.9 mm

External measurements of type.—Head and body 365, tail 266, hind-foot 58, ear 21 mm. (taken in the flesh by H.C.R.).

Cranial measurements of type.—Greatest length of skull 66.1, condylo basal length 63, basal length 59, least distance from orbit to anterior nares 24, greatest orbital breadth 43.9, least orbital breadth 20, zygomatic breadth 40, mastoid breadth 30, maxillary tooth-row (alveoli) 32.5 mm.

Specimens examined.—Three males and five females (including the type) from Terutau Island; three males and three females from Langkawi Island, North entrance to the Straits of Malacca.

Remarks.- The series from the two islands are not quite the same in colour In that from Langkawi the males are less rufous above and the females less conspicuously marked on the shoulders than in the Terutau specimens.

Galeopterus variegatus perhentianus subsp. nov.

Galeopterus pumilus Kloss *nec* Miller, Journ. F. M. S. Mus., iv, 1911, p. 187.

Type. - Adult female (skin and skull) collected on East Perhentian Island, Trengganu Archipelago, East Coast of the Malay Peninsula, on 11th September 1910 by C. Boden Kloss. Federated Malay States Museums No. 2321/10.

Diagnosis.—A small race about the size of *pumilus*, *aoris* and *terutaus*: female like *pumilus* and *aoris*: male like *aoris* but with the muzzle and forefeet more blackened: underparts paler especially on the throat.

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[1] *Galeopithecus pumilus* Miller, Smiths. Misc. Coll., 45, 1903, p. 46 Butang Ids. W. Coast Malay Peninsula, lat. 6° 30′ N.

[2] *Galeopithecus aoris* Id. ib., p. 47: Pulau Aor E. Coast Malay Peninsula, lat. 2° 30′ N.

Skull essentially as in *pumilus* and *terutaus* but the braincase narrower in both sexes. Skull of adult female with zygomatic arches more expanded and the interorbital space broader than in female *aoris*. Condylo-basal length of adult females 63—64, males 59.5—59.9 mm.

External dimensions of type.—Head and body 353, tail 230, hind-foot 59, ear 21 mm. (Collector's measurements taken in the flesh).

Cranial measurements of type.—Greatest length of skull 66.3, condylo-basal length 63, basal length 59, least distance from orbit to anterior nares 23, greatest orbital breadth 43, least orbital breadth 17, zygomatic breadth 40, mastoid breadth 40.1, maxillary tooth-row (alveoli) 31 mm.

Specimens examined.—Three males and three females (including the type: one juvenile) from East Perhentian Island.

Remarks.—One male in worn pelage is rather pale and more uniform above than the type: the other male is immature and has the grey element in the pelage more pronounced. The juvenile female is like the adults but rather darker above. The specimens on which this race is founded have already been discussed at greater length by Kloss (l.c.s.).

Notes on Flying Lemurs (Galeopterus)

by F. N. Chasen *and* C. Boden Kloss

In determining some flying-lemurs recently we had occasion to lay out the whole of our series and we took the opportunity to comment on the races represented in the material before us.

Galeopterus Thomas, 1908 (type *G. temmincki*).

The home of *Galeopterus* is Malaysia, Western Siam and Tenasserim[1] while the allied genus *Cynocephalus* is confined to the Philippine sub-region where it is represented by *Cynocephalus* (*Galeopithecus*) *volans* Linn., syn. *philippensis* (Waterhouse) *vide* Thos., Ann. Mag. Nat. Hist (8) 1, 1908, pp. 252—255.

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[1] Also recorded from Akyab, Arakan, fide Dunn, P.Z.S., 1863, p 370, while Mons. J. Delacour has lately secured an example in the forests thirty or forty miles north of Saigon, Cochin China.

The following names have to be considered.—

1.	*variegatus* Cuv., Tabl. Elem. des. Mamm. p. 107; Desm., Mamm., 1820, p. 108[1] ...	Java (Geoff., 1829).
2.	*temmincki* Waterh., P. Z. S., 1838, p. 119	Sumatra (Thos., 1908).
3.	*undatus* Wagn., Schreb. Saugth., Suppl., 1840, p. 324	Sumatra (Stone and Rehn, 1902, Proc. Acad. Nat. Sci. Philadelphia, p. 135).
4.	*pumilus* Miller, Smiths. Misc. Coll., 45, 1903, p. 46, pl. 6, fig. 3.	Adang Id., Butang Ids., West Coast, Malay Peninsula.
5.	*aoris* Miller, tom. cit., p. 47 ...	Aor Id., East Coast, South Malay Peninsula.
6.	*gracilis* Miller, tom. cit., p. 49, pl. vi, figs. 1 and 2. ..	Sirhassen Id., South Natuna Ids., South China Sea.
7.	*natunæ* Miller, tom. cit., p. 50	Bunguran Id., North Natuna Ids., South China Sea.
8.	*saturatus* Miller, tom. cit., p. 51, pl. vii, figs. 3 and 4, pl. viii	Tana Balu Id., Batu Ids., West Sumatra.
9.	*tuancus* Miller, tom. cit., p. 53.	Tuangku Id., Banjak Ids., West Sumatra.
10.	*tellonis* Lyon, Ann. Mag. Nat. Hist., (8) 1. 1908, p. 303 ...	Tello Id., Batu Ids., West Sumatra.
11.	*peninsulæ* Thos., Ann. Mag. Nat. Mist., (8) 2, 1908, p. 303	Malay States, Malay Peninsula.
12.	*taylori* Thos., Journ. F. M. S. Mus., ii, 1908, p. 102 ...	Tioman Id., East Coast, South Malay Peninsula.

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[1] The two other names proposed by Desmarest, *viz.*, *Galeopithecus rufus* (Pelew Islands) and *G. ternatensis* (Ternate Id.) are both synonyms of *Lemur volans* Linn., and therefore apply to the Philippine animal, though Lesson (Nouv. Tabl. Regne Anim., 1842, p. 11) gave Sumatra and Borneo as the habitat of *G. rufus*.

13.	*chombolis* Lyon, Proc. U. S. Nat. Mus., 36, 1909, p. 486.	Chombol Id., Rhio Arch., South of Singapore.
14.	*borneanus* Lyon, op. cit., 40, 1911, p. 124	South-east Borneo.
15.	*lautensis* Lyon, tom. cit., p. 125	Pulo Laut Id., South-east Borneo.
16	*abbotti* Lyon, tom. cit., p. 126.	Penebangan Id., W. Borneo.
17.	*lechei* Gyldenstolpe, Kungl. Sv. Vet. Akad. Handl., 60, No. 6, 1920, p. 17, pl. iii, figs. 3—7	Central East Borneo
18.	*hantu* Cabrera, Bol. Real. Soc Espan., 24, 1924, p. 128 . .	North Sarawak, Borneo.
19.	*terutaus* Chas. and Kloss, antea, p.	Terutau Id., West Coast Malay Peninsula
20.	*perhentianus* Chas. and Kloss, antea, p . .	East Perhentian Id., East Coast Malay Peninsula

Galeopterus undatus was given Sumatra as type locality by Stone and Rehn in 1902, and Java by Thomas in 1908. later in the same year the latter author stated that it could not be referred to *variegatus* on account of its large size, the type skull being 82.5 mm in condylo-basal length its exact locality remained to be discovered. We think, nevertheless, that the type most likely came from Java which does, on the whole, seem to produce the largest animals (though this is only barely demonstrable by our series), and that it may be merely an abnormally large individual. Our largest Java skulls have the condylo-basal length 76.5 mm., most nearly approached by one from the Malay States of 75.5 mm. The only area available for an un-allocated race with very distinct characters is Palawan Island; but this is in the Bornean Province in which seem to be found only the smallest of the races occurring on the larger land-masses or else the Indochinese sub-region.

Of *Galeopterus* we have before us about 125 skins, and over eighty skulls of adults (which alone need be considered) from Java, Sumatra, the Malay Peninsula, Penang and Singapore; Pulau[1] Adang and Pulau Rawi (Butang Islands), Pulau Terutau, and Pulau Langkawi in the Straits of Malacca; the Perhentian Islands, Pulau Aor, Pulau Tioman, the Anamba Islands and Great Natuna Island in the South China Sea; Pulau Galang in the Rhio Archipelago; Sarawak, British North Borneo and Banguey Island.

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[1] Pulau (Malay) = Island.

It is with this material alone that we now deal, and our keys thus merely serve to show that we can perceive differences between the animals from the various places represented in our collection.

We have been able to separate our material into groups, by means of the female skulls. The cranial characters we have used (mainly size) are based on adult skulls only, such being those in which all sutures are completely obliterated, which may show also a considerable depression of the interorbital area and have the nasals pinched up into a ridge. The zygomatic breadth is proportionately greatest in old animals; but the degree of approximation of the temporal ridges and mastoid inflation seems a guide neither to age nor to race, nor does the shape of the rostrum and palate assist in determining the latter. Many characters, even in skulls from one place, show some individual variation and variation due to age is considerable. Further we should not consider that because a skull looks adult it represents the maximum size of its race. A series can often be collected which does not show the maximum dimensions attainable; and races based on small differences in size when series are small must be accepted with reserve.

The size of the teeth is again a most unreliable character in these animals. Variation in colour, especially in males, is also very great, but races from small islands seem more stable than those from the large land masses, the maximum amount of variation being exhibited in series from Borneo.

What used to be called the brown and grey phases are sexual differences of the male and female respectively Even when both sexes are rufous (which is sometimes the case in a few races) the females are much paler than the males [1]

Flying lemurs are not found on deep water islands; *Galeopterus* occurs only in those parts of the Malayssian sub-region that lie within the 40 fathom contour line and Cynocephalus in the Philippine sub-region which stands on a marine bank of less than 100 fathoms in depth. It would appear that the ancestral form occupied these areas before the deep channels between Palawan and Mindoro, Borneo and the Sulu Islands, were formed, and that sufficient evolution has taken place to bring about a generic difference between the animals of the two sub-regions. Sub-specific differences have arisen within Malaysia which, considering the inability of these animals to cross the narrowest unforested area, or strait of the sea is not surprising. We should expect to find similar differentiation in the Philippines but it has not yet been recognised.

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[1] The peculiar formation of the external genitalia in these animals is no doubt responsible for the existence in museums of specimens in the "brown phase" labelled as females.

Flying-lemurs cannot travel, they cannot "fly": they are entirely arboreal and very helpless away from trees, the leaves and buds of which provide their food. They are strictly confined to forests.

Flying-lemurs are amongst the small group of mammals in which the female is larger than the male.

We have representatives of the following races of *Galeopterus variegatus* before us:—

Large races: condylo-basal length of the adult female skull exceeding 72 mm.

Galeopterus v. variegatus: Java.

The largest and darkest form. Sexes alike in size. Thomas (Ann. Mag. Nat. Hist. (8) 2, 1908, p. 302) gives the range of ten adults (♀ ♂), condylo-basal length 75—76 mm., but we have an adult female skull of *peninsulæ* (from Selangor) which, with a condylo-basal length of 75.5 is rather larger than an adult Javan female before us which only measures 74.5. Thomas (l. c.) also mentions a Javan female with condylo-basal length only 72 mm. but *variegatus* undoubtedly averages larger than any other race. The largest female before us measures 76.5 mm.

In colour the males are especially dark, very much darker and more saturate than the females.

G. v. temmincki: Sumatra.

Smaller and paler than *variegatus*.[1] Females larger than males (as in all succeeding forms). Condylo-basal length of females, 71.0—73 mm., males 72.2 mm.

Sexual colour differences not very well marked, the male being only slightly richer in colour: both sexes with the head and neck grey. We have seen very few examples of this race.

G. v. peninsulæ: Malay Peninsula, with Penang and Singapore Islands.

Size about as in *temmincki* but the sexes markedly different in colour: broadly speaking the male is brown or even rufous and the female grey.

The type (adult female) measured: condylo-basal length 72.5 mm.; and this is a fair average, but adult female skulls reach 75.5 mm.

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[1] *Errata* Journ. F. M. S. Mus. viii, part 2, 1918, p. 24, line 20, transpose "male" and "female".

All our males have the top of the head or neck brownish. The most highly-coloured males we have seen come from Singapore Island. We cannot detect any constant difference between the skulls of animals from Sumatra and the Malay Peninsula; but it may be noted that in *peninsulæ* only an exceptionally large female with a condylo-basal length 75.5 mm. has the maxillary tooth-row equal in length (38 mm.) to that of a much smaller female of *temmincki* in which the condylo-basal length is only 71.9 mm. It is characteristic of these very variable animals that in the next specimen examined from Sumatra the tooth row was comparatively short!

G. v. taylori: Tioman Island, East Coast of the South Malay Peninsula.

Size about as in *peninsulæ* (perhaps a little smaller) but different in colour. The largest female we have measured is 72.1 mm. in condylo-basal length, and it may be that *taylori* does not reach the maximum size of *peninsulæ*.

We cannot appreciate any significant difference in the size of the teeth of *peninsulæ* and *taylori*. In colour the females generally resemble *peninsulæ*, but have the upper surface more buffy especially on the occiput, neck and sides of the body. silvery markings obsolescent and the parachute more coarsely streaked with black: males are much darker than *peninsulæ* and almost as dark as, but more richly coloured than *variegatus*. The very dark upper side of the head rather sharply defined from the buffy nape separates all the males of *taylori* we have seen from other *Galeopterus* of the same sex before us.

Medium sized races. condylo-basal length of adult female skulls exceeding 65 mm. but not reaching 72 mm.

G. v. natunæ: Bunguran Island, North Natuna Islands; Anamba Islands.

Smaller than any of the above races. the female type of *natunæ* measures 67.6 mm. condylo-basal length and adult topotypes of the same sex in our possession measure condylo-basal length 67.0, 68.2, 68.2 mm. The sexual differences are well marked. With *natunæ* we associate five specimens (3 ♂, 2 ♀) from the Anamba Islands (Siantan): the largest female measures 69.0 mm. condylo-basal length and therefore very slightly exceeds the maximum size of *natunæ* as at present known. The females are both in the silvery grey pelage common to that sex in most of the races of *Galeopterus*: the males, all immature, are mixed rufous and grey in colour.

G. v. borneanus: Borneo and Banguey Island.

About the size of *natunæ* or a little larger. On available material and data there seems little reason for separating animals from the North Natunas, the Anambas and Borneo. As Lyon has pointed out in the original description there is considerable difference between the skulls of *borneanus* and *peninsulæ* (the differences however all being correlated with relative size) but our series of the former is so variable that we doubt if the comparative characters given for *natunæ* and *borneanus* are reliable.

With *borneanus* from the mainland of Borneo we associate four animals from Banguey Island.[1] The skulls of our largest adults measure in condylo-basal length, ♂, 69.5, 67, 67, 66; ♀, 70, 69, 70 mm. and although in Borneo occurs the smallest race found on the larger land masses it is clear that the Bornean animals cannot be placed with those of Aor Island as Thomas first suggested (Journ. F. M. S. Mus., iv, 1909, p. 111).

Thomas later said (Ann. Mag. Nat. Hist. (8) 2, 1908, p. 303), that he could see no difference between examples from N. Borneo and Sarawak and *G. natunæ* which he suggests may be the same as *G. gracilis*. *G. borneanus*, *lechei* and *hantu* are almost certainly synonymous: in the collection before us examples in the "*lechei*" condition can be selected from the material representing most of the races: they are animals in which the tail was not pinned out, or any substitute made for the vertebræ, when the skin was fresh. In the dried skin it is certainly difficult to appreciate that the uropatagium has shrunk. The cranial characters shown by the type of *lechei* are all within the range of individual variation.

None of the characters on which *hantu* (of which we have seen topotypes) was separated are of more than individual significance.

The Bornean females are of the usual grey tone and on colour not separable from *peninsulæ* females. The male is extremely variable: one is exactly like a very richly coloured male from Singapore: others resemble the more usual duller type of male found in the Malay Peninsula and yet one other is so strikingly vermiculated and brightly variegated above that it is unlike any other skin before us.

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[1] With the exception of one or two individuals of the small races found on the islands off the coasts of the Malay Peninsula our two female skulls from Banguey have the interorbital space relatively broader than any of the large series before us: in one specimen this measurement (22 mm.) is actually greater than all but a few very broad skulls of female *variegatus* and *peninsulæ*, but we are so sceptical of the value of such cranial characters in *Galeopterus* that we do not care to name the Banguey animals on account of this feature alone.

There are three specimens in the Sarawak Museum so distinct in colour that we suggest that definite colour dimorphism should be recognised in *Galeopterus*. We have ourselves obtained a male of this phase in North Borneo. The upper parts, excepting the nape which is golden-buff, are bright rufous (near "Kaiser-brown"). Two females (Sarawak Mus.) are much paler: above mainly warm buff irregularly washed with rufous on the shoulders, thighs and parachute: both sexes have scattered white spots on the dorsal surface. It is interesting to note that even when both sexes are "rufous" the male is the more richly coloured.[1]

G. v. chombolis: Pulau Chombol and (?) the other islands of the Rhio Archipelago.

Like *natunæ* but smaller.

The skull measurements of a female from Pulau Galang (condylo-basal length 65 mm) are in close agreement with the type series of this form from Pulau Chombol and although all seem larger than true *aoris*, to which race examples from various islands of the Rhio Archipelago have been referred by Thomas and Wroughton, they are smaller than *natunæ* and *borneanus*.

One of the topotypes listed by Lyon has the greatest length of the skull 69.3: its condylo-basal length is therefore, almost certainly, greater than 65 mm. This is a most unsatisfactory race and little is known of its range and characters although flying-lemurs are known to occur on many islands of the Rhio Archipelago.

It is curious that Lyon, in the same paper in which he describes *chombolis*, placed specimens from various neighbouring islands under *temmincki* for it is not likely that an isolated race occurs on Chombol virtually surrounded by another race.[2]

Smaller races: condylo-basal length of adult female skulls not exceeding 05 mm.

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[1] This colour dimorphism does not appear to be restricted to Borneo although the only four specimens we have seen come from that island vide *G. saturatus*, Miller, Smiths, Misc 45, 1903, p. 51, "red phase" and *G tellonis* Lyon, Ann. Mag. Nat. Hist. (8) 1, 1908, p. 139 (actual description).

[2] *G gracilis* Miller (which we have not seen) from Sirhassen Island, South-Natuna group, should probably be placed in this medium-sized section: the adult male type had a condylo-basal length of 65 mm but we suspect that this figure is not the maximum for the race and that, as Thomas has suggested, *gracilis* is the prior name for the medium-size race occupying the various islands of the Natuna and Anamba groups and Borneo.

G. v. pumilus: Butang Islands, Straits of Malacca.

Much smaller than any of the above races. As a series both sexes distinctly paler than *peninsulæ* but individuals not separable: females without warmer areas on the shoulders and thighs. Condylo-basal length 7 ad. ♀, 59.2—63.9: ♂, 56.9—60 mm.

G. v. terutaus: Terutau and Langkawi Islands, Straits of Malacca.

Size as in *pumilus* but females with brownish patches on the shoulders and males more richly coloured. On colour perhaps not separable from *peninsulæ*. Condylo-basal length 4 ad. ♀, 59—63.9 mm.: ♂, 58—60.9 mm. Skull as in *pumilus*.

G. v. perhentianus: Perhentian Islands, East Coast Malay Peninsula.

Size as in *pumilus* and *terutaus*. Females like *pumilus*: males most like *terutaus* but with muzzle and forefeet blackened. Brain-case narrower than in *pumilus* and *terutaus*. Condylo-basal length 2 ad. ♀. 63—64 mm.: 3 ad. ♂. 59—59.9 mm.

G. v. aoris: Pulau Aor, East Coast Malay Peninsula.

Size as in the above races but adult females with the zygomatic arches less expanded and interorbital breadth narrower brain-case narrow as in *perhentianus*. When series are compared we cannot appreciate any difference in the breadth of the palate and the size of the teeth in *pumilus* and *aoris* and we doubt if the slightly greater maxima for the skulls of *aoris* as shown by our series is indicative of any real difference in size between the races. Only one female before us reaches 65 mm in condylo-basal length. and the next largest animal measures 63.2 mm.

In colour the females are like *pumilus* and *perhentianus*. males most like *terutaus* and *perhentianus* but as a series darker and less rufous than the former and less blackened on the muzzle and fore-feet than the latter Condylo-basal length 6 ad. ♀, 60.9—65: 5 ad. ♂, 58—61.8 mm.

Key based on adult skulls

A. Max. Condylo-basal length ad. ♀ exceeding 72 mm.
  a. C.-b. length ad. ♀ exceeding 75.5 mm. ... *variegatus.*
  b. C.-b. length ad. ♀ not exceeding 75.5 mm. *temmincki, peninsulæ. taylori.*

B. Max. Condylo-basal length ad. ♀ exceeding 65 mm. but not reaching 72 mm.

a. Total length ad. ♀ skull not exceeding 70 mm. ... ... *chombolis.*

b. Total length ad. ♀ skull exceeding 70 mm. *natunæ, borneanus.*

C. Max. Condylo-basal length ad. ♀ not exceeding 65 mm.

a. Braincase narrower—

a^1. Zygomatic arches more expanded; interorbital breadth broader (♀) ... *perhentianus.*

b^2. Zygomatic arches less expanded; interorbital space narrower (♀) ... *aoris.*

b Braincase broader ... . *pumilus, terutaus.*

Key based on colour

Males

A. *Large races*—

a. Colour very dark.

a^1. Nape greyish or not sharply defined from crown ... ... *variegatus.*

b^1. Nape buffy, contrasting with crown ... *taylori.*

b. Colour less dark.

a^1. Strongly rufous or brownish in general tone ... ... *peninsulæ.*

b^1. Only rather more richly coloured than the "grey phase" (♀ ♀) of most races. *temmincki.*

B. *Medium sized races.*—

a. Rufous or brownish in general tone ... *natunæ, borneanus, chombolis.*

C. *Small races.*—

a. Paler ... ... *pumilus.*

b. More richly coloured—

a^1. Muzzle and forefeet blackened ... *perhentianus.*

b^1. Muzzle and forefeet less blackened.

a^2. Paler and more rufous ... *terutaus.*

b^2. Darker and less rufous ... *aoris.*

Females

A. *Large races.*—
  a. Colour very dark ... ... *variegatus.*
  b. Colour paler—
    a^1. Entirely grey or faintly buffy above ... *peninsulæ.*
    b^1. More washed with buff above—
      a^2. Nape greyish ... ... *temmincki.*
      b^2. Nape strongly buffy ... ... *taylori.*

B. *Medium sized races.*—
  a. Grey above ... ... *natunæ,*
    borneanus[1]
    chombolis.

C. *Small size.*—
  a. Brownish areas on shoulders ... ... *terutaus.*
  b. No brownish areas, shoulders slightly infuscated ... ... *pumilus,*
    aoris,
    perhentianus.

Two New Malaysian Birds

by F. N. Chasen *and* C. Boden Kloss

Hypothymis azurea javana sub-sp. nov.

Males differ from *H. a. prophata* Oberholser (Great Karimon Id., East Sumatra) in being of a slightly less intense blue. Females, on the contrary, have the under-parts suffused with a slightly stronger blue and the upper-parts a less saturate brown, being greyer and washed with blue there.

Types. Adult male and female from Badjoelmati, East Coast of Java. Collected by C. Boden Kloss on 5th February and 31st January, 1920. Nos. 5996 and 5842. Wings 72.5 and 70 mm.

Specimens examined Three males from East and six from West Java; one female from East and one from West Java, all adults. Also four immature brown backed examples 3 ♂, 1 ♀). Compared with many examples of *H. a. prophata* from Sumatra, the Malay Peninsula and Borneo.

We are indebted to the Zoological Museum Buitenzorg, Java, for the loan of seven Javanese specimens to supplement our own series.

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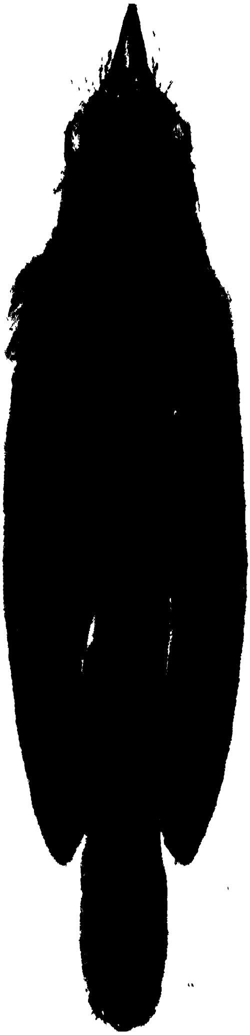
[1] Occasionally brilliant cinnamon brown.



I *Cyornis rufigastra sumatrensis*
(Sharpe) ♀ ad
Taiping, Perak, Malay Peninsula

II. *Cyornis rufigastra indochina*
Chas & Kl ♀ ad
Daban, South Annam *(Type)*

Munia atricapilla batakana sub-sp. nov.

Individuals of *Munia atricapilla* from the north of the Malay Peninsula are variable: the abdomen is generally, but not always, black; but it is not sharply margined. A few resemble examples from the southern half of the Peninsula in which the abdomen, etc., and thighs are only slightly infuscated: while in quite fifty per cent these areas are merely a slightly deeper shade of chestnut than the general colour which is paler than in northern examples. The former we would place under *M. a. atricapilla* (Vieill.), type locality Southern Bengal[1]: the latter are *M. a. sinensis* Blyth (Cat. Birds Mus. Asiat. Soc., 1849, p. 337, Malay States: syn. *M. a. sumatrensis* Bartlett, Mon. Weaverbirds; *Munia* p. 29, pl. v, fig. 3, ♂ Java, Sumatra, Penang and Malay States).

We have before us two examples from a series of four which were obtained by Mr. A. C. van Heyst at Brastagi, Simeloengan, in the Batak Highlands of N. E. Sumatra, 1,390 metres. Wings 49, 50, 50, 50 mm.[2] The chestnut colour of one can be matched by, but the others are paler than, South Malayan birds from which all differ in having sharply-defined, brownish-black abdominal patches, vents and under-tailcoverts.

On account of this coloration and smaller size we distinguish them as *M. a. batakensis*.

Type. Adult female, No. 1393, A. C. van Heyst. Collected on 28th January, 1919. Wing 50 mm.

On Some Birds of the Genus Cyornis

By F. N. Chasen, M.B.O.U. *and* C. Boden Kloss, M.B.O.U.,

(Plate I)

Several attempts have been made lately to clear up the position of some of the more typical and difficult members of the genus *Cyornis*. We consider the revision of Dr. E. Stresemann to be the only satisfactory one ("Ueber einige *Cyornis*-Arten," Ornith. Monatsber., XXXIII, 1925, pp. 43—53) and we offer the following remarks and additional information on some of the forms included in his paper which, with one or two minor exceptions, is very acceptable to us.

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[1] *Vide* Robinson and Kloss, Journ. Nat. Hist. Soc. Siam, V, 1924, p. 112.

[2] *Vide* Rob. and Kl., Journ. Straits Branch Roy. Asiat. Soc., No. 81, 1920, p. 112.

Our observations should be read side by side with Stresemann's article as we have not repeated the synonymy, etc.; they are limited in scope, being practically confined to the material before us, and deal essentially with Malaysia and part of Indo-China[1].

In addition to the collection of the Raffles Museum, Singapore (in which is now incorporated most of the collection formerly in the Federated Malay States Museums) we have, thanks to their custodians, been able to examine material from the following institutions:—the Zoological Museum, Calcutta; the Museum of the Bombay Natural History Society; the Colombo Museum, Ceylon; and the United States National Museum, Washington.

In his arrangement of races into five "formenkreise" Stresemann relies mainly on the plumage of the female; but although our ideas as to the constitution of a "species" are very broad we find that some of the sections (*banyumas, rufigastra, rubeculoides, superba* and *elegans*) produced by this method are not altogether satisfactory if viewed as species and in some cases we suspect that they may represent a convenient grouping of closely related species rather than true sub-specific relationship.

In the present state of our knowledge this is, perhaps, unavoidable and having no better arrangement to offer we adopt Stresemann's groups as species with one exception. As it has lately been stated that in Borneo there lives a bird (*montana* Rob. and Kinn.) very closely related to *cœrulifrons* of the Malay Peninsula we have regarded it as the Bornean form of *banyumas* and have thus had to treat *cœrulata*, with its forms, as a species or group—the genus *Schwaneria* of Bonaparte.

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[1] This paper was written early in 1927, but was put aside as we wished to incorporate in it the results of a forthcoming visit to North Borneo after we had made use of the fresh information obtained it was sent in November 1927 to the Editor of "Ibis", who showed it to Mr H. C. Robinson and learnt that he and Mr N. B. Kinnear were engaged at the Natural History Museum, South Kensington, in the preparation of a review of the same genus On hearing this I asked Mr. Sclater to return our manuscript.

Messrs. Robinson and Kinnear's article has now appeared in "Novitates Zoologicae" of July 1928 (Notes on the genus *Cyornis*, Blyth, vol. XXXIV, pp 231—261) and I have decided to print ours as it stood after entering references to Robinson and Kinnear's work, making a few alterations, which are acknowledged in footnotes, and a few comments and additions, which appear in square brackets. For the rest we see no reason to change our views.

It may interest ornithologists to see how the study of different material by different workers has sometimes produced different results. It would, under the circumstances, be too much to hope that conclusions independently reached regarding these difficult birds would always be the same.

Messrs Robinson and Kinnear have dealt with a number of species and forms not discussed by us as we confine our review to those birds of Malaysia spreading to Indo-China, India and Ceylon which possess bluish-backed rusty-breasted males For lack of sufficient material we have not included the forms occurring in the Philippine and Austro-Oriental sub-regions (*vide* antea pp. 4—5).—*C. Boden Kloss.*

In some of the skins we have examined it is evident that a post-mortem change has affected the colour of the under-parts, freshly collected skins being yellower and less rusty below than older specimens

KEY TO THE GROUPS

Females only

A. With brown or grey-brown crown and back.	
a. Tail brown, or brown and blue	**banyumas** group.
a^1. Tail brown, never blue.	*banyumas, cantatrix, lemprieri, magnirostris.*
b^1. Tail brown, or particoloured brown and blue	*montana, coerulifrons, whitei.*
b. Tail blue	**cærulata** group.
B. With brown crown and back, tail never blue ...	
a. Tail duller, hazel to cinnamon brown ...	**rubeculoides** group.
b. Tail brighter, Sanford's brown	**superba** group.
C. With blue, or bluish olive grey[1], crown, back and tail	
a. Lores albescent, bright frontal area absent ...	**rufigastra** group.
b. Lores black, bright frontal area present ...	**turcosa** group.

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[1] *C. rufigastra indochina* only.

Banyumas Group

Crown and back brown, or grey-brown, in females; tail either brown, or particoloured blue and brown.

The Malayan *cærulifrons* and the Indo-Chinese *whitei* with particoloured brown and blue tails may perhaps be regarded as members of this group connecting it with the more brightly coloured *cærulata* group in which females are blue-tailed.

Section *a*: *Tail always brown in females.*

Cyornis banyumas banyumas (Horsf.).

Cyornis [*banyumas*] *banyumas* Stresem. (part.), p. 48.

Cyornis banyumas banyumas Rob. and Kinn. (part.), p. 250.

Cyornis banyumas limitans Rob. and Kinn., p. 251.

East and Central Java. does not occur in the Malay Peninsula (contrary to Baker, Bull. B. O. C., lxiv, 1923, p. 10)

Specimens examined by us from East Java; Badjoelmati, Tamansari, Idjen: Central Java; Karangbolang.

Wings, 5 ♂ 74—77; 8 ♀ 70—74 mm.

The type locality of *banyumas* is the Province of Banjoemas in Central Java.

[*Cyornis banyumas limitans* Robinson (Bull. B. O. C., XLVIII, 1927, p. 44) from East Java is *C. b. banyumas* (Horsf.).

In "Treubia", V, 1924, pp. 279, 280, Robinson and Kloss recorded birds from Central Java (Karangbolang, 20 miles south of Banyumas) and others like them from East Java as *C. b. banyumas* (Horsf.) and placed more richly coloured individuals from Western Java (Mt. Gedeh westwards) under *C. b. cantatrix* (Temm.). The two series were so determined because they were in agreement with the descriptions and coloured plates given by Temminck (Pl. Col., No. 226 and text) and Horsfield (Zool. Res., text and plate).

In the last work Horsfield regards the two birds as con-specific but with certain differences:—"M. Temminck's figure of *Muscicapa cantatrix*, which has above been cited as a synonym, represents a defined line along the forehead extending backward over the eyes, which in our specimens [of *banyumas*] is less distinctly marked. It is also clearly pointed out in his description." This refers to the males. Of the females Horsfield says:—"In the female [of *banyumas*] agreeably to M. Temminck's description [of the female of *cantatrix*] the head and neck are greyish, the back olive, the tail and wings brown, bordered by reddish; the under-parts have generally a paler orange tint and the mark on the sides of the head and neck is whitish."

Temminck's *cantatrix* is the darker bird and is now known to inhabit West Java. Birds from the extreme east do not differ materially from others from the habitat of Horsfield's bird: they are all the paler *banyumas*.

Robinson's *limitans* is this paler form with less distinctly pronounced forehead and superciliaries. He says that females are paler and greyer above than more western females, but this is only sometimes the case (four specimens out of eight examined by us). |

Cyornis banyumas cantatrix (Temm.)

Cyornis [*banyumas*] *banyumas* Stresem. (part.), p. 48.

Cyornis banyumas banyumas Rob. and Kinn. (part.), p. 250.

West Java.

Specimens examined by us from Oedjoengteboe, Tjiomas, Wynkoop's Bay, Buitenzorg, Tjibodas, Mt. Gedeh.

Wings, 14 ♂ 75—77; 4 ♀ 72—74 mm.

Stresemann regards *cantatrix* as a synonym of *banyumas* but the name is required for the West Javan race (type locality.—West Java, Rob. and Kloss, Treubia, V, 1924, p. 280; here restricted to the Province of Bantam).

Compared with *banyumas* the male of *cantatrix* is more brightly coloured, being deeper blue above and more ferruginous below, especially on the abdomen: the female of *cantatrix* is also a trifle more ferruginous below than the female *banyumas*, particularly on the abdomen.

In both races young males moult straight from the spotted juvenile plumage into the adult dress and it may be that even in the juvenile plumage the tail is blue from the first.

Cyornis banyumas lemprieri Sharpe.

Cyornis [*banyumas*] *lemprieri* Stresem., p. 48.

Cyornis lemprieri Rob. and Kinn., p. 249.

Palawan, Balabac and Calamianes Islands, north of Borneo.

Not seen by us.

Cyornis banyumas magnirostris Blyth.

Cyornis banyumas magnirostris Stresem., p. 47.

Cyornis magnirostris Rob. and Kinn., p. 48.

Nepal to Cachar (*fide* Stresemann).

Specimens examined by us from Darjeeling, Tenasserim, Peninsular Siam.

Wings, ♂ 82; 3 ♀ 76 mm.

This form migrates S. E. in winter to Peninsular Siam (Trang, lat. 8° N.), and thus is found at times in the habitats of its allies *whitei* and *cœrulifrons*.

Section *b*: *Tail brown, or brown and blue, in females.*

[**Cyornis banyumas montana** Robinson & Kinnear.

Cyornis whitei montana Rob. and Kinn., Nov. Zool., xxxiv. 1928, p. 244 (Liang Koebang Mountains, Central Borneo).

"*Male*: Much darker blue above than *C. w. cœrulifrons* Baker, the bright forehead and superciliaries not so conspicuous. Rump not brighter than back. Below almost uniform ferruginous, including the under tail coverts. *Female*: Distinctly darker above, with less rusty chestnut on the rump and base of tail feathers.

The Bornean race is evidently closely allied to that from the Malay Peninsula. It is apparently a submontane form, widely distributed in the island, but not common."

Not seen by us.]

Cyornis banyumas cœrulifrons Baker.

Cyornis [*banyumas*] *cœrulifrons* Stresem., p. 47.

Cyornis whitei cœrulifrons Rob. and Kinn., p. 243.

Considered by Stresemann to extend from the mountains of the Malay Peninsula northwards from Selangor to the Isthmus of Kra. A submontane bird.

Wings 13 ♂ 70—77; 8 ♀ 65.5—72 mm.

The male is deeper blue above than in the Javan forms: on the underparts it is nearest to *C. b. banyumas*. The female is less grey above than in both Javan forms and paler below with the abdomen whiter.

In three females out of eight the tail is partly blue and in one partly grey-blue. One female, taken in February, has some blue feathers on the forehead and the crown of the head tinged with blue.

Males vary in the depth of the blue on the upper surface. Even in the spotted juvenile plumage the male has a blue tail.

Cyornis banyumas whitei Harington.

Cyornis [*banyumas*] *whitei* Stresem., p. 47.

Cyornis whitei whitei Rob. and Kinn., p. 242.

Northern Burma and Western Yunnan; Central Burma to the Kachin Hills (*fide* Stresemann); Tenasserim.

Rothschild (Nov. Zool., XXXIII, 1927, p. 292) thinks that *whitei* and *cærulifrons* (from the Malay Peninsula) are alike and Stuart Baker states (Bull. B. O. C., XLIV, 1923, p. 10) that *whitei* and *dialilæma* are inseparable; but Stresemann (who examined the types of both) recognises slight differences between *whitei* and *cærulifrons* and considers that neither has any relationship to *dialilæma*: we agree.

In his "Anatomical and Zoological Researches" Anderson deals with various specimens of *Cyornis* (pp 610—20) obtained by the Yunnan Expedition in 1868 and with an additional example from Upper Burma:—a ♀ Kabyuet, 10th January, 1875 (not a ♂ as recorded).

First as regards the three birds he recorded as *Cyornis tickelli*. They are in the Natural History Museum and Sharpe in the Catalogue of Birds, IV, places the female under *rubeculoides* and the two males under *tickelli*. Oates, in his two books, accepts the nomenclature.

Lord Rothschild is the last to deal with them (Nov. Zool., XXXIII, 1926, p 292) He refers the males (female not mentioned) to *whitei*: he has probably seen the former.

It may be pointed out that Anderson's remarks under *C tickelli* seem to apply not to those so listed only, but to all the specimens of *Cyornis* discussed by him

The following seven birds were recorded by Anderson as *Cyornis rubeculoides*. They were retained in the Indian Museum and are before us now. We give the sex and localities, the name as written on their labels. Be it noted that *Cyornis jerdoni* means *C. tickelliæ*:—

a. ♂ Kabwet, Upper Burma, 10th Jan., 1875 (actually a ♀). *C. rubeculoides*.

b. ♀ Upper Burma, March 1868[1].

c. ♀ Bhamau, Upper Burma, 6th Feb., 1868 *C. rubeculoides*, altered to *jerdoni*.

d. ♂ Tapeng R., 21st March, 1868, 1,700 ft. *C. jerdoni*.

e. ♂ Ponsee, Kakhyen Hills, 2nd May, 1868, 3,300 ft. *C. jerdoni*

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[1] Now mounted or disappeared unless, as from its make-up and appearance we believe, a female skin labelled "*C. rubeculoides*, no history" is this specimen.

f. ♂ Ponsee, Kakhyen Hills April 1868, 3,300 ft. *C. jerdoni.*

g. ♀ Ponsee, Kakhyen Hills, 15th March, 1868, 3,300 ft. *C. jerdoni*[1].

Rothschild accepts Anderson's published determinations for these birds for he says the latter collected 3 ♀♀ *rubeculoides* at Ponsee, March—May 1868, and 1 ♂ Tapeng River, 1868 (*t.c.s.* p. 293). He has evidently not seen them for of the three he calls females, two (*e* and *f* of Anderson with the ♂ sign dropped from the text) are males, only *g* is a female.

Now of these seven specimens, the three males with their rufous chins and abdomens and absence of bright blue on the rump, etc., cannot be referred to the *rubeculoides* group or forms *i.e.*, to *dialilæma*: if they are *whitei* as, being practically topotypes of it, they well may be, then that bird is emphatically not *rubeculoides dialilæma* as Baker maintains (Bull. B. O. C., xliv, 1923, p. 10). The three males are to-day only separable from *cærulifrons* males, by duller, less intense blue upper parts; and by more rusty abdomens than some *cærulifrons* males.

They agree with the original description of *C. whitei* ♂ (Ann. Mag. Nat. Hist., (8) II, 1908, p. 245), the presumed females of which were said by Harington not to differ from those of *rubeculoides*.

Anderson's females before us, now sixty years old, also do not differ from *rubeculoides* females; Harington records a blue tail-feather in one of his female paratypes; there is a female in the Indian Museum from Maygoola, Tenasserim, 4,000 ft., likewise with blue tail-feathers, but otherwise inseparable from Anderson's birds; *rubeculoides* females are not known to have any blue in their tails.

These females are altogether paler, more "washed out" below than *cærulifrons* females: above they are much paler and browner, lacking the greyish olivaceous tint on head and back, and their tails are much more ferruginous, less fuscous (except the Tenasserim bird in which the tail alone is similar to blue-tailed *cærulifrons* female).

Thus both sexes differ from *cærulifrons* in being paler, less intensely coloured.

It must be accepted, we feel, that these females are those of *whitei* for it would be too improbable that in each instance when a collector has obtained *whitei* males, all the females associated with them should be *dialilæma* females.

The "Zoological Researches" seems to require amendment by deletion of all reference to *rubeculoides* and insertion of the seven specimens recorded under it beneath *Cyornis tickelli.* Some one in the Calcutta Museum had evidently realised this and re-determined the males and two of the females as "*jerdoni*". To-day we should call all Anderson's birds *C. whitei.*

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[1] Delete from Anderson the first mentioned "15th March, 1868" under *e, f, g*: there are only three specimens and the first two are males.

Cærulata Group

Crown and back brown in females: tail blue.

Cyornis cærulata cærulata (Bp.).

Cyornis [*banyumas*] *cærulata* Stresem. (part.), p. 47.

Cyornis cærulata Rob. and Kinn. (part.), p. 253.

South, East and North Borneo; and ? Sumatra.

Specimens examined by us from Marah, Long Hoet and Long Petah in the Kutei district of Middle East Borneo and from Bettotan near Sandakan in North Borneo.

Wings, 8 ♂ 72—78 · 6 ♀ 69—72 mm.

Females of this and the next form are more vividly coloured than those of the *banyumas* group.

We consider that two slightly differentiated races occur in Borneo, an eastern and a western one. The type of *cærulata* came from "Sambajaran" in South Borneo and, by analogy, is most likely to resemble Eastern birds. We, therefore, propose to consider, by elimination, birds from the localities listed above as *cærulata* and to recognise those from Sarawak as distinct with the name of *rufifrons* Wallace.

The blue of the male is rather variable and one bird in fresh plumage is almost black on the crown Young males in their first moult have the tail and mantle bright blue, the underparts immaculate and the head and wings boldly spotted with rufous-buff.

This is essentially a bird of the forests and is not found in the mangrove areas.

Stresemann lumps *Schwaneria cærulata* and *Cyornis nigrogularis*, although he does not consider that the two birds have been proved to be identical beyond doubt. *C nigrogularis* is slightly different being the same as the closely allied *rufifrons*. We agree that *Schwaneria* is not worth recognition as a genus: the large bill is a species character of *C. cærulata.*

Cyornis cærulata rufifrons Wallace.

Cyornis nigrogularis Everett, Ibis, 1891, p. 45.

Cyornis [*banyumas*] *cærulata* Stresem., (part.), p. 47.

Cyornis cærulata Rob. and Kinn. (part.), p. 253.

Sarawak, West Borneo; and ? Sumatra.

Specimens examined by us from Kuching, Baram, Saribas, Lio Matu and Balinean.

Wings, 9 ♂ 73—78; 2 ♀ 69 mm.

Differs from *cærulata* in that the male is more deeply coloured below: females (two examined) have more tendency to develop blue above, the scapulars and wing-coverts being slightly tinged with this colour.

Some males are faintly marked on the mantle and scapulars with elongated black spots.

C. rufifrons Wallace is not a synonym of *rufigastra* as Stresemann considers, but is "*cærulata*" as Sharpe stated in Cat. Birds, IV, p. 451. It is impossible tnat a bird with "forehead and lines above and below the eye rufous" can belong to a species in which both sexes are blue: and even in nestling plumage are blue-grey spotted with buff. The type of *rufifrons* is no doubt an immature male, but as shown above the name is available for the slightly differentiated Sarawak representative of *cærulata*

Stresemann states that, judging from a Sumatran male from Palembang examined by him, *cærulata* occurs in that island. Sumatran birds are more likely to be the West than the East Bornean form. The male from the Ophir district recorded in 1924 by Robinson and Kloss as *Cyornis* sp inc (Journ Federated Malay States Mus., XI, p. 269) also probably belongs to it. The latter authors suggested that *cærulata*, *rufifrons* and *nigrogularis* were synonymous.

Rufigastra Group

Females with crown and back brown, tail hazel to cinnamon brown.

Cyornis rubeculoides rubeculoides (Vig.).

Cyornis rubeculoides rubeculoides Stresem., p. 51.

Cyornis rubeculoides rubeculoides Rob. and Kinn., p. 232.

Kashmir to Assam (sen. gen) We have also seen examples from Kani, Lower Chindwin, Upper Burma, and a male from South Irradwadi in Burma. Migrates in winter as far south as Ceylon.

Males have the foreneck dark blue, generally without any rufous emargination which, when present, is only slight in extent.

[**Cyornis rubeculoides rogersi** Robinson & Kinnear.

Cyornis rubeculoides rogersi Rob. and Kinn., p. 233.

Arakan Yomas, and possibly the Lower Chindwin.

Males like *C. r. dialilæma*: females more richly coloured than those of the other races.

Robinson and Kinnear suggest that this form is confined to the Arakan Hills.

Not seen by us.]

Cyornis rubeculoides dialilæma Salvad.

Cyornis [*rubeculoides*] *dialilæma* Stresem., p. 52.

Cyornis rubeculoides dialilæma Rob. and Kinn., p. 233.

Described from Karenni. We have seen specimens from Mt. Victoria. Pakkoku; from near Maymo; from the Thoungyeen River and from Mergui, all in Burma: also from near Raheng. Western Siam. All these birds are like *r. rubeculoides* but the rufous of the breast extends further up the foreneck though never reaching the chin (*vide* Oates, Birds II, Fauna Brit. India, p. 24).

(A male labelled "Baghownie, Tirhout, C. M. Inglis," which should belong to the typical race, is inseparable on appearance from the present form).

Robinson and Kloss at one time treated *Cyornis rubeculoides chersonesites* Oberh. ("Malay Peninsula and Southern Tenasserim") as a synonym of *sumatrensis*, but we agree with Stresemann and place it under *dialilæma*. This will extend the range of *dialilæma* down the Malay Peninsula to Trang, lat. 7° N. (where the next form to be dealt with occurs, though no doubt only as a migrant).

Cyornis rubeculoides glaucicomans Thayer & Bangs.

Cyornis [*rubeculoides*] *glaucicomans* Stresem., p. 51.

Cyornis rubeculoides glaucicomans Rob. and Kinn., p. 234.

Central China and Yunnan, migrating southwards as far as Peninsular Siam

Cyornis anak Robinson and Kloss, published in Journ. Federated Malay States Mus., X, 1922, p. 201, is not mentioned in Stresemann's paper. Birds placed under it are only known at present from Peninsular Siam (Trang, Nakon Sri Tamarat and Ghurbi: lat. 7—9° N.).

Wings, 2 ♂ 78—79 mm.

Colour as in *C. r. dialilæma* (the rufous of the foreneck perhaps extending further up towards the throat) but size much larger.

It is possible that these birds are only winter visitors (type series, January to March) and are the *glaucicomans* of Streesemann[1] in Orn. Monat., XXXIII, 1925, p. 51, and the Yunnan birds listed by Rothschild in Nov. Zool., XXXIII, 1926, p. 293, as *M. r. dialilæma* with the remark "I expect this form will have to be separated on account of its larger size".

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[1] We have not seen the original description of *Cyornis tickelliæ glaucicomans* Thayer and Bangs. (Hupeh, Central China).

[Examination of the types of *glaucicomans* and *anak* by Messrs Robinson and Kinnear confirms our suggestion that the latter is *glaucicomans* in winter quarters. They have also seen examples from Upper Burma, Central Siam and South Tenasserim.]

Cyornis rubeculoides klossi Robinson.

Cyornis [*rubeculoides*] *klossi* Stresem., p. 52.

Cyornis rubeculoides klossi Rob. and Kinn., p. 234.

Known to us from the type series from South Annam and a female from Lat Bua Kao, E. Siam (which may be *dialilæma* but is inseparable from topotypes of *klossi*). Possibly the *C. r. rubeculoides* of Delacour and Jabouille is this bird.

Wings, 2 ♂ 71—72; 2 ♀ 67—69 mm.

Males have the pattern of the foreneck as in *dialilæma* and *anak* but are separable at once from both by the much paler underparts which are ochraceous instead of tawny, and from *anak* by smaller size as well.

Superba Group

Females with crown and back brown, rump and tail pure bright ferruginous.

Cyornis superba Stresemann,

Cyornis superba Stresem., p. 52.

Cyornis superba Rob. and Kinn., p. 252.

Borneo.

Specimens examined by us from Sarawak (including a topotypical male from Mt. Penrisen); West Kutei district, E. Borneo; Bettotan near Sandakan, N. Borneo (sea-level).

Wings, 9 ♂ 72—78.5; 5 ♀ 69—71 mm.

A male from the Baram district of Sarawak is more turquoise above than other birds of the same sex from Sarawak and one of the females from Kutei (not fully adult) has the abdomen and tail-coverts whitish thereby contrasting with an adult female from the same locality which is fulvous throughout below.

Rufigastra Group

Females with crown and back blue, or bluish olive-grey: lores albescent, bright frontal area absent.

Cyornis rufigastra nesæa Oberholser

Cyornis rufigastra nesæa Stresem., p. 49

Cyornis tickelliæ jerdoni Rob. and Kinn., p. 237.

Ceylon (and South India *fide* Stresemann).

We have seen topotypes: they are darker above and below in both sexes than *C. r. tickelliæ*.

Cyornis rufigastra tickelliæ Blyth.

Cyornis [*rufigastra*] *tickelliæ* Stresem., p. 48.

Cyornis tickelliæ tickelliæ Rob. and Kinn., p. 237.

Central and parts of North India, east to Karenni, south to South India (where *fide* Stresemann it meets *C. r. nesæa*. We have examined specimens from various parts of its range.

Cyornis rufigastra indochina Chasen & Kloss (pl. I).

Cyornis rufigastra indochina Chasen and Kloss, Bull. B. O. C. xlviii, 1928, p. 73.

Cyornis rufigastra sumatrensis Stresem. (part.), p. 49.

Cyornis tickelliæ sumatrensis Rob. and Kinn. (part.), p. 238.

Cyornis tickelliæ sub-sp., Rob. and Kinn., p. 241.

South Annam to S. W. Siam (? Karenni). The southern limit of the range in the Malay Peninsula is probably about 10° N. Lat. Possibly the *C. banyumas dialilæma* of Delacour and Jabouille is this bird.

Wings, 11 ♂ 66—72; 7 ♀ 65—68 mm.

Males like *sumatrensis*, or scarcely perceptibly paler blue above but females less blue on the upperparts which are dark olive grey, tinged with blue or russet, pure blue when present being restricted to the tail and perhaps faintly showing on the rump. The type from Annam has only a very faint tinge of blue in the tail as also two females from Raheng others from Lat Bua Kao, E. Siam and Hat Sanuk, S. W. Siam have the tail blue as in *C. r. sumatrensis* to which the last are nearest, both geographically and in appearance.

[With Messrs. Robinson and Kinnear's refusal to recognise *Cyornis rufigastra indochina* we can best deal pictorially, figuring on the accompanying coloured plate (pl. I.) a characteristic female of *C. r. sumatrensis* from the south of the Malay Peninsula and a typical female of *C. r. indochina* from South Annam. That, according to Robinson and Kinnear, birds from Tonkin are extreme examples of the race described from South Annam but do not merit separation from it though deserving a name when compared with *tickelliæ* and the true *sumatrensis*, does not affect the standing of *indochina*, so very different as our plate shows from the Malayan form—and from the Indian race also.

No doubt had we possessed a Tonkin bird we might have made it our type; but, because C, later, turns out to be more distinct from A than is B, it does not follow that the differences exhibited by B must be ignored.

The point is:—is there justification for separation of C from B? Robinson and Kinnear say there is none, but they say there is ample justification for separating C from A. By their own argument B. is distinct.

Cyornis rufigastra indochina ranges from South Annam south to the Isthmus of Kra and north to Tonkin. Sometimes we act too hastily: but we should go far too slowly if, before we distinguished any form, we waited till we had examples from the extremities of every part of the range of a species: one could never be quite sure that there was not "something further". Besides, it is not "practical politics" while there are still different views of what a species is.]

Cyornis rufigastra sumatrensis (Sharpe).

Cyornis [*rufigastra*] *sumatrensis* Stresem. (part.), p. 49.

Cyornis tickelliæ sumatrensis Rob. and Kinn. (part.), p. 238.

The range of this form as given by Stresemann extends from the Malay Peninsula north across Tenasserim to Karenni and east to Annam, but we place the limit of true *sumatrensis* as lat. 10° N. in the Malay Peninsula. The most southerly of many Peninsular specimens before us is an undoubted male from Dusun Tua in Selangor. The most southerly female we have is from Taiping in Perak and it is the bluest above of our female series: it could perhaps be regarded as an intermediate between *sumatrensis* and *rufigastra*.

[The presence of this race in Sumatra has been questioned, but Robinson and Kinnear have now seen an indubitable example from that island].

Wings, 19 ♂ 65—73; 9 ♀ 65—71 mm.

Both sexes assume the blue plumage at the first moult.

C. frenatus Hume is a synonym of *C. r. rufigastra* and not of *C. r. sumatrensis*.

Cyornis rufigastra rufigastra (Raffles).

Cyornis [*rufigastra*] *rufigastra* Stresem., p. 49.

Cyornis beccariana beccariana Rob. and Kinn. (part.), p. 245.

South Malay Peninsula, Sumatra, Borneo and adjacent islands In the Malay Peninsula this form is found southwards from the mouth of the Perak River whence we have it represented by one male. Next in proximity to this we have a pair from the Klang River, Selangor, which are topotypes of *frenatus* Hume. We also have specimens from Singapore, the Rhio Archipelago, Sumatra and Borneo.

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[1] In our opinion there is nothing in the description of *Muscicapa rufigastra* to show that it is not the common South Malayan bird (occurring also in Sumatra) later described as *C. frenatus* by Hume. Raffles' name has so often been used for this form that we do not propose to upset further accepted nomenclature by following Messrs. Robinson and Kinnear in using *beccariana* Salvad., based on Sarawak examples.

Wings, Malay Peninsula and Singapore 8 ♂ 71—75; 6 ♀ 68—71: Rhio Archipelago ♂ 72: Sumatra ♂ 72: Borneo 7 ♂ 73—77; 10 ♀ 68—73: Banguey Island, N. Borneo ♂ 80; ♀ 74: Mallewallé Island, N. Borneo ♂ 77 mm.

Our series seems to show that birds from the Bornean area attain rather larger wing maxima than Malay-Sumatran ones (♂ 80, ♀ 74 against ♂ 75, ♀ 71) and there are more large-billed individuals among them. There are no colour differences and we do not think that any separation is necessary, though names based on Bornean material are available·—*beccariana* Salv. and *hesei* Finsch.

The Bornean birds are certainly not *philippensis* Sharpe, for though the males of that race are with difficulty separated from typical *rufigastra* its females are not like that bird, but are nearer *sumatrensis*, or intermediate. *C. litoralis* Stresemann, of Palawan Island is described as pale as *rhizophoræ* and brighter than *rufigastra* above, with a whiter, less rusty abdomen than either.

Males of *rufigastra* only differ from *cærulifrons* males (*banyumas* group) in having more black on the chin and, on the whole, the under tail-coverts more rufous, less albescent. Females are deep blue above, much darker than *sumatrensis* females, with pronounced white lores and no black on the chin. Males show a rather unusual amount of variation in the size of the bill: specimens from the North Bornean islands of Banguey and Balambangan have rather robust bills compared with some from the Malay Peninsula, but another bird from Mallewalle Island has a small bill. in Borneo itself both large and small-billed birds occur.

The colour of the under tail-coverts in both sexes is another variable character for they may be either white or tawny. The amount of white on the abdomen is also not constant.

This is essentially a mangrove bird and is not met in other forests except on small islands. We find that a distinct, but as yet undescribed, form of *rufigastra* (s.s.), occurs on the Karimon-Java Islands in the Java Sea. It is represented in the collection of the Zoological Museum, Buitenzorg, by seven specimens.

The latitudinal ranges of *rufigastra* and *sumatrensis* overlap in the southern half of the Malay Peninsula. In spite of this it is doubtful if the two will be found side by side, for whereas *rufigastra* is as noted above, a mangrove and coastal bird. *sumatrensis* lives on the jungle-clad hills. The same local distribution will probably be found to occur in Sumatra.

[**Cyornis rufigastra calocephala** Oberholser.

Cyornis rufigastra rufigastra Stresem., p. 49.

Cyornis beccariana calocephala Rob. and Kinn., p. 246.

We have seen no examples of the bird from Banka Island which has been named *Cyornis banyumas calocephala* by Oberholser

(Proc. Biol. Soc., Wash., XXXIII, 1920, p. 86). It is not accepted by Stresemann, but Robinson and Kinnear maintain it for birds from Banka to the Rhio Islands (south of Singapore Strait) and the adjacent coast of Sumatra: according to them these birds are very saturate. It would appear, however, that Oberholser does not regard this race as inhabiting Sumatra since in his description of it, and later in 1924, he refers to birds from that island as *C. banyumas rufigastra*. A pair from the Rhio Islands are inseparable from our *C. r. rufigastra* and we doubt if the *calocephala* of Robinson and Kinnear has any real existence: the range they indicate is most artificial, for the Strait of Singapore is scarcely likely to be a subspecific boundary in the case of a coastal bird.]

Cyornis rufigastra lampra Oberholser.

Cyornis [*rufigastra*] *lampra* Stresem., p. 50.

Cyornis tickelliæ lampra Rob. and Kinn., p. 240.

Found only in the Anamba Islands, South China Sea. Stands closest to *sumatrensis*, the males before us are very slightly larger and more tinged with fulvous on the flanks

Wings, 8 ♂ 73—75 mm.

Cyornis rufigastra karimatensis Oberholser.

Cyornis rufigastra karimatensis Stresem., p. 49 (not examined).

Cyornis beccariana karimatensis Rob. and Kinn., p. 246 (not examined).

Karimata Islands, off the South-west coast of Borneo. The name rests on a single male "Similar to *Cyornis banyumas rufigastra* (Raffles) from Sumatra, but much larger; throat, breast and crissum decidedly darker" (Oberholser, Proc. U. S. Nat. Mus., LXIV, 1924, Art 22, p. 3).

Not seen by us.

Cyornis rufigastra philippensis Sharpe.

Cyornis rufigastra philippensis Stresem., p. 50.

Cyornis beccariana philippensis Rob. and Kinn., p. 247.

This race, wide-spread in the Philippine and Sulu Islands, occurs on Sibutu Id., the westernmost of the Sulu chain, which lies off the mouth of Darvel Bay on the east side of North Borneo and within, though barely so, the 100-fathom contour line that determines the Malaysian sub-region. Sibutu is separated by much deeper sea from the adjacent Tawi-tawi, but in the opinion of Worcester and Bourns, though it has a distinct Bornean element, its avifauna is largely Philippine (*vide* Proc. U. S. Nat. Mus., XX, 1898, p. 598).

Sibutu birds not seen by us.

Cyornis rufigastra litoralis Stresemann.

Cyornis [*rufigastra*] *litoralis* Stresem., Ornith. Monatsb. XXIII, 1925, p. 50.

Cyornis beccariana beccariana Rob. and Kinn. (part.), p. 245.

Palawan Island, north of Borneo.

"Above as bright as in *rhizophoræ* and brighter than in *rufigastra*. Belly whiter, less rusty than in either.

Wing, ♂ 70, 73 mm."

Not seen by us.

Cyornis rufigastra rhizophoræ Stresemann.

Cyornis [*rufigastra*] *rhizophoræ* Stresem., Ornith Monatsb. XXXIII, 1925, p. 50.

Cyornis beccariana beccariana Rob. and Kinn. (part.), p. 245.

This form was described from the mangrove forests of the west coast of North Java as differing from *rufigastra* in having the blue of the upperparts and the ferruginous of the breast brighter ("heller") in both sexes.

A series of six skins in the Buitenzorg Museum (examined by us) from Sebesi Island in the Sunda Strait differs from *rufigastra* in being very slightly lighter blue above.

Wings, ♂ 72—74; ♀ 70—71 mm.

Turcosa Group[1]

Females with crown and back blue, lores black, bright frontal area present.

Dr. Stresemann is no doubt right in keeping this group separate from the others, but it may be noted that the male *turcosa* is very like the male *rubeculoides* and that the ranges of the two birds are never coincident. However, the females are very different.

Cyornis turcosa rupatensis Oberholser.

Cyornis elegans rupatensis Oberh., Proc. Biol. Soc., Wash., XXXIII, 1920, p. 87.

Cyornis elegans Stresem. (part.), p. 53.

Cyornis turcosa Rob. and Kinn. (part.), p. 236.

Sumatra, South Malay Peninsula and Western Borneo (*i.e.* Sarawak and West North Borneo). Specimens from each of these areas have been examined by us.

Wings, 10 ♂ 74—78; 9 ♀ 72—75 mm.

We have seen *Cyornis elegans rupatensis* Oberholser (Proc. Biol Soc. Wash., 33, 1920, p. 87; E. Sumatra) and are of opinion that the characters ascribed to the type are only due to individual variation such as is exhibited in the series of 10 males and 5 females now before us (*vide* also Rob. and Kloss, Journ. Federated Malay States Mus., VIII, 1918, p. 154). The name can therefore be used for the western form.

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[1] Messrs. Robinson and Kinnear point out that *Muscicapa elegans* Temm., is preoccupied by *Muscicapa elegans* Less. Availing ourselves of this information we use *turcosa* for the species name of this bird.

Cyornis turcosa turcosa Bruggemann.

Cyornis elegans Stresem. (part.), p. 53.

Cyornis turcosa Rob. and Kinn. (part.), p. 236.

South-east Borneo. The type locality of *turcosa*, Mocara Tewah, is only 100 miles south of Long Iram, Mahakkan River, whence came *Cyornis elegans antelia* Oberh. (Proc. Biol. Soc. Wash., 33, 1920, p. 87). We have before us a series of 4 males and 4 females (Buitenzorg Museum, E. Siebers leg.) from localities about 80 miles N. E. of the latter. They are paler, less rufous on breast, flanks and abdomen in both sexes than *rupatensis*. *C. e. antelia* is therefore a good race, but it is the same as *turcosa*.

Wings, 4 ♂ 78; 3 ♀ 73—75 mm.

Distribution

The *Bornean* province possesses most of the flycatchers we have dealt with. they are represented therein by eleven forms in five groups, but four of the races come from the smaller islands within it.

The huge composite area of "*British India*" with *Ceylon* comes next with nine forms in three groups.

The *Malayan* province has eight forms (one being an island race) in four groups

South-eastern Indo-China has three groups in which six forms should probably be included.

About equal with the last is the *Sumatran* province with three groups and six forms (two from islands)

The *Javan* province with two groups and only four forms (one again from small islands) is poorest.

Thus the sub-region of *Malaysia* is far richer than "British India": it possesses three groups *turcosa*, *cærulata* and *superba*) unknown elsewhere and representatives of the other three groups altogether twenty-two forms. The Malay Peninsula and Borneo are rich, Sumatra moderate, and Java poor. The whole Indo-Chinese sub-region has one group practically confined to it except for stragglers, *i.e.*, *rubeculoides*; and one well marked form, *magnirostris*, though this visits the Malay Peninsula: it possesses nine forms in three groups. Peninsular India is poverty-stricken: it has only one group represented by *tickelliæ* which it shares with Indo-China, and a slightly different form, *nesæa*, which occurs in Ceylon as well.

[Where Messrs. Robinson and Kinnear have examined more extensive material than Dr. Stresemann and ourselves they have been able to give a rather wider distribution in a few cases.]

"British India" 3 groups, 9 forms.

banyumas group

magnirostris	Nepal to Tenasserim.
whitei	Northern Burma to Tenasserim.
cærulifrons	Tenasserim.

rufigastra group

nesæa	Ceylon and South India.
tickelliæ	Central and North India to Assam and Burma.
indochina	Tenasserim.

rubeculoides group

rubeculoides	Himalayas to Burma. In winter south to Ceylon.
dialilæma	Central Burma to Tenasserim.
rogersi	Arakan Yomas.

South-eastern Indo-China. 3 groups, ? 6 forms

(French Indochina and Siam to the Isthmus of Kra.)

banyumas group

? *magnirostris*	North and Western Siam.
? *whitei*	North and Western Siam.
cærulifrons	South-west Siam. ? West Siam.

rufigastra group

indochina	Siam to Annam.

rubeculoides group

dialilæma	Siam
klossi	Annam, E. Siam (?).

Malayan Province. 4 groups, 8 forms

(The Peninsula south of the Isthmus of Kra and various neighbouring islands).

banyumas group

magnirostris	Peninsular Siam.
cærulifrons	South to Selangor.

rufigastra group

sumatrensis	South to Selangor.
rufigastra	Perak to Singapore.
lampra	Anamba Ids., South China Sea.

rubeculoides group

dialilæma	Peninsular Siam.
glaucicomans	Peninsular Siam (on migration).

turcosa group

rupatensis	Perak to Singapore.

Bornean Province. 5 groups, 11 forms

banyumas group

montana	Borneo (montane and sub-montane).
lemprieri	Palawan.

cærulata group

cærulata	South, East and North Borneo.
rufifrons	North-west Borneo (Sarawak).

rufigastra group

rufigastra	Borneo.
karimatensis	Karimata Ids., W. Borneo.
litoralis	Palawan.
philippensis	Sibutu Id., N. E. Borneo.

turcosa group

rupatensis	North-west Borneo.
turcosa	South-east Borneo.

superba Group

superba	Borneo.

Sumatran Province. 3 groups, ? 6 forms

cærulata Group

? *cærulata* or *rufifrons*	Sumatra.

rufigastra group

rufigastra	Sumatra.
sumatrensis	North-east Sumatra.
calocephala	Banka Island.
? *rhizophoræ*	Sebesi Island, Sunda Strait.

turcosa group

rupatensis	Sumatra.

Javan Province. 2 groups, 4 forms

banyumas group

banyumas	East and Central Java.
cantatrix	West Java.

rufigastra group

rhizophoræ	North-west Java.
sub-sp. nov. ined.	Karimon Java Islands, Java Sea.

Wasps and Bees in the Raffles Museum, Singapore

By CEDRIC DOVER

I. Wasps.

My examination of the *Vespidæ* in the collections of the Raffles Museum has resulted in nothing of outstanding interest but a list of the species will be useful as most of the locality records are new[1]. The collection is a representative one of the commoner species and indicates the paucity of our knowledge of the Malayan *Vespidæ*. As an incentive to further work I have added an annotated bibliography: the classification adopted is that of Bequært (1918) and it will be noted that many nomenclatorial changes have taken place since the publication of Bingham's volume in the "Fauna of British India" series.

Family **Vespidæ**

Sub-family ZETHINÆ

Genus **Labus** Saussure

1. **Labus exigua** Sauss. Dover, 1925, p. 291; *Labus humbertianus* Sauss. Bingham, 1897, p. 349; *Eumenes exigua* Sauss. Bingham, 1897, p. 348.

Singapore Island.

Attention is drawn to the absence of the genus *Zethus* in the collection.

Sub-family EUMENINÆ

Genus **Eumenes** Latreille.

2. **Eumenes architectus** Smith, Bingham, 1897, p. 339.

Singapore Island.

3. **Eumenes coarctatus punctatus** Sauss., Dover, 1925, p. 291; *Eumenes punctata* Sauss., Bingham, 1897, p. 339.

Singapore Island; Sarawak, Borneo.

I have expressed doubt (*loc. cit.*) as to the validity of Bingham's Tenasserim record, but the above localities show that it is obviously correct.

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[1] These accounts of the wasps and bees in the Raffles Museum, Singapore, S. S. were written by Mr. Dover early in 1926. The material they deal with has since been transferred to the Selangor Museum, Kuala Lumpur, F. M. S.—*C. Boden Kloss.*

4. **Eumenes maxillosus** var. **petiolatus** Fabr., Dover and Rao, 1922, p. 237; Dover, 1925, p. 295; *Eumenes petiolata* Fabr., Bingham, 1897, p. 341.

Pegu, Burma.

5. **Eumenes maxillosus** var. **circinalis** Fabr., Dover, 1925, p. 295; *Eumenes circinalis* Fabr., Bingham, 1897, p. 340.

Singapore Island; Selangor; Tebing Tinggi, Kelantan; Kuala Tembeling, Pahang; Gurun, Kedah; Matang, Sarawak.

6. **Eumenes caffer** var. **esuriens** Fabr., Dover, 1925, p. 295; *Eumenes esuriens* Fabr., Bingham, 1897, p. 342.

Singapore Island.

7. **Eumenes caffer** var. **gracilis** Sauss., Dover, 1925, p. 295; *Eumenes gracilis* Sauss., Bingham, 1897, p. 343.

Singapore Island; Tebing Tinggi, Kelantan; Rangoon, Burma.

8. **Eumenes arcuata** Fabr., Dover, 1925, p. 296, fig. 6.

Singapore Island: Lubok Tamang, Pahang, 3,500 feet; Kedah Peak, Kedah, 3,200 feet; Matang and Lundu, Sarawak; Mount Ophir, Johore; New Guinea.

Genus **Pareumenes** Saussure

9 **Pareumenes depressa** Sauss., Dover, 1925, p. 296, *Eumenes depressa* Sauss., Bingham, 1897, p. 337.

Baram River, Sarawak.

Genus **Odynerus** Latreille

10. **Odynerus (Rygchium) hæmorrhoidalis** Fabr., Dover, 1925, p. 298, *Rhynchium hæmorrhoidale* Fabr., Bingham, 1897, p. 354.

Singapore Island and Pulau Ubin; Mount Ophir, Johore; Lundu, Sarawak.

Bequært (1918) regards *Rhynchium* Sauss. (= *Rygchium* Spinola, which has priority), as a sub-genus of *Odynerus*, and this arrangement is now generally accepted.

11. **Odynerus (R.) mellyi** Sauss., Bingham, 1897, p. 356.

Rangoon, Burma.

12. **Odynerus (R.) argentatum** Fabr., Dover, 1925, p. 297; *Rhynchium argentatum* Fabr., Bingham, 1897, p. 358.

Singapore Island; Kota Tinggi and Gunong Pulai, Johore; Gurun, Kedah; Ronpibun, Peninsular Siam.

13. **Odynerus (s.s.) confluentus** Smith, Bingham, 1897, p. 367; Meade-Waldo, 1910, p. 100.

Baram River, Sarawak.

14. **Odynerus fragilis** Smith, Bingham, 1897, p. 367.

Singapore Island.

15. **Odynerus multipictus** Smith, Bingham, 1897, p. 368.

Singapore Island; Gurun, Kedah.

16. **Odynerus bipustulatus** Sauss., Bingham, 1897, p. 369.

Singapore Island.

17. **Odynerus guttatus** Smith, Dover, 1925, p. 298.

Singapore Island.

Sub-family STENOGASTRINÆ

Genus **Stenogaster** Guerin

18. **Stenogaster micans** Smith, Bingham, 1897, p. 378; *Ischnogaster fulvipennis* Cam., Journ. Str. Br. Roy. As. Soc., No. 37, p. 106, 1902.

Singapore Island; Kuala Teku, Pahang, 500—700 feet; Gunong Angsi, Negri Sembilan, 2,000—2,900 feet; Gurun, Kedah; Nakon Sri Tamarat, Peninsular Siam; Baram River, Sarawak.

Following Bequært (1918) I have sunk *Ischnogaster Guerin*, in favour of the same author's *Stenogaster*, and have discussed the question in my first paper (Dover and Rao, 1922, p. 235). Cameron's *I. fulvipennis* is without any doubt a synonym of this species.

19. **Stenogaster fraterna** Bingham, 1897, p. 378; Dover, 1925, p. 301.

Mount Ophir, Johore; Bukit Kutu, Selangor; Maxwell's Hill, Perak, 3,800 feet. There is also a specimen of the var. *scitula* Bingham, from the Khasi Hills, Assam.

20. **Stenogaster nigrifrons** Smith, Bingham, 1897, p. 397; Dover and Rao, 1922, p. 241.

Singapore Island; Pulau Bulang.

21. **Stenogaster flavolineata** Cam., Journ. Str. Br. Roy. As. Soc., No. 37, p. 108, 1902.

Kota Tinggi, Johore; Maxwell's Hill, Perak, 3,800 feet.

22. **Stenogaster nitidipennis** Sauss., Bingham, 1897, p. 380.

Singapore Island.

It might be noted that the locality "Cayenne" recorded by Bingham with a query, is certainly erroneous.

Sub-family EPIPONINÆ

Genus **Polybia** Lepel

23. **Polybia orientalis** Sauss., Bingham, 1897, p. 383; Meade-Waldo, 1911, p. 108, 1914 B, p. 406; Dover and Rao, 1922, p. 243; *Icaria singapurensis* Cam., 1904, p. 120.

Singapore Island; Kota Tinggi, Johore; Gurun, Kedah.

I have examined the type of *Icaria singapurensis* Cam. in the Raffles Museum and it is certainly the same as *Polybia orientalis* Sauss.

24. **Polybia indica** Sauss., Bingham, 1897, p. 384.

Pegu Hills, Burma.

25. **Polybia sumatrensis** Sauss., Bingham, 1897, p. 385; Meade-Waldo, 1911, p. 108.

Lubok Tamang, Pahang, 3,500 feet; Jor, Batang Padang, Perak; Maxwell's Hill, Perak, 3,570 feet; Kedah Peak, 3,200 feet; Gunong Kledang, Perak, 2,646 feet; Gunong Angsi, Negri Sembilan, 2,060—2,200 feet; Bukit Kutu, Selangor; Semangko Pass, Selangor—Pahang, 2,700 feet; Kuala Teku, Pahang, 530—570 feet; Pulo Adang, Peninsular Siam; Penang Hill, 2,500 feet; Mount Poe, Sarawak.

In a long series the absence of specimens from Singapore is noteworthy.

Sub-family ROPALIDINÆ

Genus **Ropalidia** Guerin

26. **Ropalidia ferruginea** Fabr., Dover and Rao, 1922, p. 244; *Icaria ferruginea* Fabr., Bingham, 1897, p. 387.

Common all over Singapore. Reasons for sinking *Icaria* Saussure, as a synonym of *Ropalidia* Guerin, are given by Bequært, 1918, p. 244.

27. **Ropalidia guttatipennis** Sauss., Bingham, 1897, p. 387.

Singapore Island.

28. **Ropalidia variegata** Smith, Dover and Rao, 1922, p. 244; *Icaria variegata* Smith, Bingham, 1897, p. 388.

Common all over Singapore; Kota Tinggi, Johore; Tras, Pahang.

29. **Ropalidia speciosa** Sauss., Bingham, 1897, p. 390 (*Icaria*); Meade-Waldo, 1914, B, p. 406 (*Icaria*).

Singapore Island; Bukit Kutu, Selangor, 3,457 feet; Kota Tinggi, Johore; Kuala Teku, Pahang, 510—700 feet, 3-12-1921, Gunong Angsi, Negri Sembilan, 2,000 2,700 feet; Lubok Tamang, Lipis District, Pahang, 3,500 feet, 23-6-1923, F. N. C.; Mount Ophir, Johore; Gunong Kledang, Perak, 2,646; Maxwell's Hill, Perak, 2,150 feet; Kedah Peak, 3,200 feet; Khao Ronpibun, Peninsular Siam, 2-3-1922; Khao Ram, Peninsular Siam, 750—1,200 feet, 23-11-1922; Baram River, Sarawak.

The type of Cameron's *Icaria rufinoda* from Singapore in the Raffles Museum is undoubtedly the same as *Ropalidia speciosa* as Meade-Waldo supposed.

30. **Ropalidia aristocratica** Sauss., Bingham, 1897, p. 391 (*Icaria*).

Singapore Island.

Genus **Paraicaria** Grib.

31. **Paraicaria bicolor** Grib.; Bingham, 1897, p. 392.

Singapore Island.

Sub-family POLISTINÆ

Genus **Polistes** Latreille

32. **Polistes marginalis** var. **stigma** Fabr., Dalla Torre, 1904, p. 70; *Polistes stigma* Fabr., Bingham, 1897, p. 396.

Singapore Island; Mount Ophir, and Kota Tinggi, Johore; Tebing Tinggi, Kelantan; Nakon Sri Tamarat and Khao Ronpibun, Peninsular Siam.

33. **Polistes maculipennis** Sauss., Bingham, 1897, p. 396.

Singapore Island.

34. **Polistes hebræus** Fabr., Dover, 1925, p. 303; Gunong Tahan, Pahang, 5,550 feet.

There are two specimens of the variety *macænsis* from Singapore and Rangoon.

34. **Polistes sagittarius** Sauss., Bingham, 1897, p. 395.

Singapore Island; Mount Ophir, Johore, 2-8-1905; Kedah Peak, 3,200 feet; Gunong Tahan, Pahang; Ronpibun, Peninsular Siam.

35. **Polistes sagittarius** Sauss., Bingham, 1897, p. 395.

Singapore Island; Mount Ophir, Johore, 2-8-1905; Kedah Peak, 3,200 feet; Gunong Tahan, Pahang; Ronpibun, Peninsular Siam.

Sub-family VESPINÆ

Genus **Vespa** Linn.

36. **Vespa dorylloides** Sauss., Bingham, 1897, p. 400.

Gunong Kledang, Perak, 2,646 feet; Kuala Tahan and Gunong Tahan, Pahang; Bukit Kutu, Selangor, 3,457 feet; "Johore"; Gunong Tamabo, Sarawak.

I am unable to give references to Du Buysson's monograph (1904) as it is not obtainable locally, but this work should be consulted if possible.

37. **Vespa cincta** Fabr., Bingham, 1897, p. 402.

This species is common all over the Indo-Malaysian areas. It is the commonest species of the genus in Singapore.

38. **Vespa basilis** Smith, Bingham, 1897, p. 403.

Khao Ram, Peninsular Siam, 750—1,200 feet.

39. **Vespa auraria** Smith, Bingham, 1897, p. 407.

Lubok Tamang, 3,500 feet, and summit of Gunong Berumban, 6,050 feet, Pahang.

40. **Vespa tyrranica** Smith, Bingham, 1897, p. 66.

Singapore Island.

This species was identified by Meade-Waldo by comparison with the type, but if I had not seen his label I would have been very much inclined to place it under *V. velutina* Lepel, going according to Bingham's description of the latter. *V. tyrranica* is known, I think, only from Singapore.

41. **Vespa annulata** Smith, Dalla Torre, 1904, p. 64.

Singapore Island; Bukit Kutu, Selangor, 3,457 feet; Gunong Angsi, 2,000 2,790 feet; Semangko Pass, Selangor—Pahang, 2,700 feet; Kota Tinggi, Johore; Kuala Teku, Pahang, 550—700 feet; Gurun, Kedah; Tras, Pahang: Gunong Tamabo and Mount Poe, Sarawak.

BIBLIOGRAPHY

The following is a complete list of papers since 1904 and up to 1925 on Malayan, Bornean, Sumatran and Javanese *Vespidæ*. Though stray papers on Indian species are not recorded, the list has been so compiled as to contain practically all that is necessary for the student of Malayan wasps. Biological references are listed separately. It will be observed that the biology of no Malayan wasp has been studied thoroughly.

Systematic

1897. Bingham, C. T.· The Fauna of British India including Ceylon and Burma. *Hymenoptera*, I. (An indispensable work).

1903. Cameron, P.: Descriptions of new genera and species of *Hymenoptera* taken by Mr. Robert Shelford at Sarawak, Borneo—Journ. Straits Branch Roy. As. Soc. No. 39, pp. 89—181. (Missed out of Dalla Torre's list. Describes *Icaria malayana. I. maculifrons*, *Ischnogaster fuscipes*, *Montezumia flavobalteata*, *Odynerus rugifrons*, *O. carinicollis O. robertianus*, *Rhynchium matangense*, *Zethus rufofemoratus*, spp. nov).

1904. Dalla Torre, K. W. von.: *Hymenoptera*, fam. *Vespidæ*, in Wytsman's Genera Insectorum, Fasc. xix. Bruxelles. (Lists all the known species till 1904).

1904. Cameron, P.: On some *Hymenoptera* from the Raffles Museum, Singapore—Journ. Str. B. Roy. As. Soc. No. 41, pp. 110—122.

1904. Buysson, R. Du Monographies des Guepes ou Vespa—Ann. Soc. Ent. France, pp 485—556, 565—633, pls. V—X. (An important work).

1905. Buysson, R. Du Descriptions d'Hymenopteres noveaux—Bull. Soc. Ent. France, pp. 281—282.
(*Ischnogaster serrei*, Batavia, *I. striatulus*, Sumatra, spp. nov.).

1905. Cameron, P.: On the Malay Fossorial *Hymenoptera* and *Vespidæ* of the Museum of R. Zool. Soc. "Natura artis magistra" at Amsterdam—Tijdschr. Ent., xlviii, pp. 48—78. (*Icaria intermedia*, *I. rugoplagiata*, *I. bilineata*. *Odynerus drescheri*, *Polistes varicornis*, *P. javanicus*, Java, spp. nov.).

1905. Cameron, P.: A third Contribution to the Knowledge of the *Hymenoptera* of Sarawak—Journ. Straits Branch Roy. As. Soc. No. 44, pp. 93—168. (*Odynerus kuchingensis*, *O. matangensis*, spp. nov.).

1906. Cameron, P.: A fourth Contribution to the Knowledge of the *Hymenoptera* of Sarawak—op. cit., No. 46, pp. 103—123. (*Ischnogaster clypealis*, sp. nov.).

1906. Bingham, C. T.: Report on the Aculeate *Hymenoptera*—Fasciculi Malayenses, Zoology, III, pp. 19-60, pi. A.

1907. Cameron, P.: A Contribution to the Knowledge of the *Hymenoptera* of the Oriental Region—Ann. Mag. Nat. Hist. (7), XX, pp. 81—92. (*Odynerus hewitti*, *O. heterospilus*, Borneo, spp. nov.).

1907. Cameron, P.: Descriptions of New species of *Hymenoptera* from Borneo—Journ. Str. Br. Roy. As. Soc., No. 48, pp. 1—26. (*Icaria parvimaculata*, sp. nov.).

1908. Cameron, P.: On Some undescribed *Vespidæ* from Borneo—Deuts. Ent. Zeits., pp. 561—565. (*Icaria erythrospila*, *I. ornatipes*, *I. curvilineata*, *Odynerus brooksii*, *O. santubongensis*, spp. nov .

1908. Buysson, R. Du: Deux Hymenoptères nouveaux de Java—Leiden, Notes Mus., 30, pp. 123—126. (*Icaria jacobsoni*, Batavia, sp. nov.)

1909. Buysson, R. Du: Monographie des Vespides du genre *Belanogaster*—Ann. Soc. Ent. France, 78, pp. 199—270, pls. II—VII. (A revision of the geneus).

1909. Cameron, P.: On a new species of *Zethus* (*Eumenidæ*) from Borneo—Entom., 42, p. 206. (*Z. ecchellsii*, sp. nov.).

1910A. Meade-Waldo, G.: New Species of *Diploptera* in the collection of the British Museum—Ann. Mag. Nat. Hist. (8), V, pp. 30—51. (*Montezumia wallacei*, Sumatra, sp. nov.)

1910B. Meade-Waldo, G.: New Species of *Diploptera* in the collection of the British Museum—Ann. Mag. Nat. Hist. (8), VI, pp. 100—110. (*Odynerus moultoni*, Sarawak, sp. nov. *O. hyades* Cam. = *O. confluentus* Sm., *O. cilicius* Cam = *O. latipennis* Sm.).

1911. Meade-Waldo, G.: New Species of *Diploptera* in the collection of the British Museum—Ann. Mag. Nat. Hist. (8), VII, pp. 98—113. (*Icaria flavobilineata* Cam. to *Polistes*, *Icaria sulcisculis* Cam. et *I. rubriscutis* Cam. M. S. = *Polybia Sumatrensis* Sauss., *I. fuscipennis* Cam. = *Polybia orientalis* Sauss.).

1913. Schulthess, A. V.: Vespiden aus dem Stockholmer Museum—Ark. Zool. Stockholm, 8, No. 17. (*Odynerus aurivillianus*, Philippines, Sumatra, sp. nov.).

1913. Schulthess, A. V.: *Parapolybia* Saussure, *Vespidæ* sociales Bern. Mitt. Schweiz. ent. Ges., 12, pp. 152—164, pl. XI, XI*a* (*P. Meadeana*, Borneo, sp. nov.).

1913. Buysson, R. Du: Sur deux Vespides de Java—Bull. Mus. Paris, pp. 436—437. (*Ischnogaster jacobsoni*, Java, sp. nov.).

1914A. Meade-Waldo, G.: Notes on the *Hymenoptera* in the collection of the British Museum with descriptions of New Species—Ann. Mag. Nat. Hist. (8), XIV, pp. 450—464. (*Ischnogaster levifoveatus*, Borneo, sp. nov.; various records of species of *Ischnogaster* from Borneo and Straits Settlements).

1914B. Meade-Waldo, G.: Notes and synonymy of *Hymenoptera* in the collection of the British Museum—Ann. Mag. Nat. Hist. (8), XIV, pp. 402—407. (*Zethus erythrostomus* Cam = *Calligaster cyanopterus* Sauss., *Zethus rufofemoratus* Cam. = *Montezumia pulchella* Sm., *Odynerus kuchingensis* Cam. = *O. diescheri* Cam., *O. santubongensis* Cam. = *O. megaspilas* Cam., *Icaria rufinoda* Cam. = *I. speciosa* Sm. Also synonymy of *Polybia trientalis* Sauss.

1918. Bequært, J.: A Revision of the *Vespidæ* of the Belgian Congo based on the collection of the American Museum Congo Expedition with a list of the Ethiopian Diplopterous Wasps—Bull. Amer. Mus. Nat. Hist., IX, pp. 1—384, pls. I—VI. (Though not strictly necessary for the student of Malayan *Hymenoptera* this is an ideal work, containing remarks on classification, taxonomic characters, distribution, excellent descriptions, life-history notes, etc., and every student of the *Hymenoptera* should endeavour to study it).

1922. Dover, C.: Résumé of Recent Progress in our knowledge of the Indian Wasps and Bees—Journ. As. Soc. Beng. (n.s.) XVIII, pp. 17—23. (Indicates all the important literature on Indian *Vespidæ*, etc.).

1922. Dover C. and Rao, H. S.: A note on the Diplopterous Wasps in the collection of the Indian Museum—Journ. As. Soc. Beng. (n.s.) XVIII, pp. 235—249. (*Stenogaster sarawakensis*. *S. bicarinata* Sarawak, spp. nov. Many locality records and life-history notes).

1925. Dover, C.: Further notes on the Indian Diplopterous Wasps—Journ. As. Soc. Beng. (n.s.) XX, pp. 289—305. (Many notes on synonymy which are not recapitulated as the paper is easily obtainable).

BIOLOGICAL

In my two papers in 1922 most of the literature on the biology of Indian Wasps is indicated. *See* also Gravely, Rec. Ind. Mus., XI, XXVIII, p. 960, 1921 (insect-eating habits of *Vespa cincta*); Khare, J. B. N. H. S., XXIX, p. 304, 1923 (*Eumenes conica* nest); Chopra, J. B. N. H. S., XXX, p. 858, 1925 (*Vespa cincta* nest).

II. BEES.

(With a note on the Honey Bees in the Federated Malay States Museums.)

In this paper is given a complete list of the bees in the Raffles Museum, except for some thirty specimens in indifferent condition and obscure species which it is impossible to identify in the absence of a good reference collection; new species are described. It will be seen that the collection does not represent even a fair proportion of the rich Apid-fauna of the Malay Peninsula, several common genera such as *Halictus*, *Prosopis*, *Nomioides*, *Sphecodes*, etc., being absent.

With so large a group it is practically impossible to provide a really useful bibliography, as I have attempted to do for the Vespidæ: the principal literature may, however, be indicated. The most useful work is still Bingham's first volume on *Hymenoptera* in the "Fauna of British India" series and the literature on Indian *Hymenoptera* has been listed by Ramakrishna Aiyar in *Journ. Bomb. Nat. Hist. Soc.*, XXIV—XXV, 1916—1917, and surveyed by myself in *Journ. As. Soc. Beng.* (n.s.) XVIII, 1922. Cockerell's various papers in the *Annals and Magazine of Natural History*, and Meade-Waldo's papers in the same journal are practically indispensable, while Cameron's papers in *Journ. Straits Branch Roy. As. Soc.*, 1902 onwards should also be consulted. The honey-bees have been monographed by Buttel-Reepen (1906) and Enderlein (1906), the *Xylocopinæ* by Maidl (1912), the *Megachilinæ* by Friese in *Das Tierreich* (1911). Important contributions have also been made by Friese, Maidl and Strand, and these can always be listed from the *Zoological Record*.

Family **Apidæ**

Sub-family ANDRENINÆ

Genus **Nomia** Latr.

1. Nomia terminata Smith.

1897. *Nomia terminata* Sm., Bingham, Faun. Brit. Ind. Hym. I, p. 459, fig. 146.

1916. *Nomia terminata* Sm., Meade-Waldo, Ann. Mag. Nat. Hist. (8), XVII, p. 459.

1902. *Nomia robusta* Cam., Journ. Str. Br. Roy. As. Soc., 37, p. 114.

Gurun, Kedah; Maxwell's Hill, 4,500 ft., and Gunong Kledang, 2,646 ft., Perak; Santubong, 2,600 ft. and Kuching, Sarawak.

The Santubong specimen, though agreeing with the others in every particular, has only two cubital cells in the forewing, which, if it had been an unique specimen, would prevent its inclusion n the genus *Nomia*. *N. terminata* is not easily separated from *N. fuscipennis*, but I believe I am right in regarding Cameron's species (though his description is very poor) as a synonym of *N. terminata* and not of *N. fuscipennis*. It may be mentioned here that Meade-Waldo (*loc. cit.*) gives *Nomia bicarinata* Cam., as a synonym of *N. bidiensis* Cam., doubtfully supposing *bicarinata* to be an M. S. name. In *Journ. Str. Br. Roy. As. Soc.*, 39, 1903, p. 177, Cameron describes a *Nomia* as *N. bicarmata*, which seems to be a misprint for *bicarinata*, the description also agreeing fairly well with that of *N. bidiensis*.

2. N. iridescens Smith.

1897. *Nomia iridescens* Sm., Bingham, tom. cit., p. 452.
Singapore Island.

3. N. formosa Smith.

1897. *Nomia formosa* Sm., Bingham, tom. cit., p. 451.
Singapore Island; Kota Tinggi, Johore.

These specimens were labelled *N. iridescens* by Cameron, but that species is readily distinguished by the absence of a metallic blue band on the basal abdominal segment, which is present in the specimens before me. *N. formosa* is rather close to *N. curvipes*, but the enclosed space at the base of the median segment is closely punctured in the former and longitudinally striate in the latter. *N. curvipes* also apparently does not usually extend very much further than Burma, while *N. formosa* is found in the Malaysian Subregion.

There is an interesting aberrational specimen from Seletar, Singapore Island, VIII, 1911, belonging I am sure to this species, which might be noted. It has the whole of the face distorted: the left eye is very much more curved than the right, its apex below not reaching as far as that of the right eye; the left antenna is also inserted nearer the inner orbital margin than the right, and the clypeus and the convex portion above it are very much misplaced. The second abdominal segment is apparently broader on the right side than on the left, and the segment is so constricted about the middle as to give it the appearance of being two segments. The legs and tegulæ are pale ferruginous and this, together with the fact that the enclosed space at the base of the median segment is not distinctly punctured but has an indefinite striated appearance, led me to believe that it may be a specimen of *N. curvipes*, but I do not think that this can be so.

Sub-family NOMADINÆ

Genus **Crocisa** Jurine

4. C. smithii Dalla Torre.

1924. *C. smithii* Dalla Torre, Dover, Ann. Nat. Hofmus. Wien, XXXVIII, p. 119

Singapore Island; Pulau Ubin; Pulau Aor off E. coast of Johore; Kota Tinggi and Gunong Parali, Johore; Baram, Sarawak.

Bingham gives this form as a synonym of *C. emarginata* (*tom. cit.* p. 517), but it is constantly smaller and certainly distinct, at least varietally.

Sub-family MEGACHILINÆ

Genus **Megachile** Latr.

5. M. tuberculata Smith.

1897. *Megachile tuberculata* Sm., Bingham, tom. cit., p. 475. Perhentian Tinggi, Negri Sembilan; Baram River, Sarawak.

6. M. atrata Smith.

1897. *Megachile atrata* Sm., Bingham, tom. cit., p. 475.

Singapore Island.

7. M. conjuncta Smith.

1897. *Megachile conjuncta* Sm., Bingham, tom. cit, p. 479.

Singapore Island; Mt Ophir, Johore; Tebing Tinggi, Kelantan; Ronpibun, Peninsular Siam.

8. M. miniata Bingh.

1896. *Megachile miniata* Bingham, Journ. Bomb. Nat. Hist. Soc X, p. 199, pl. 1, fig. 6.

Bukit Kutu, IV.1915; Semangko Pass, 2,700 ft., III.1912; Perhentian Tinggi, 2.IV.1915; Gunong Angsi, Negri Sembilan, 2,000—2,290, IV.1918; Gunong Tamba, Long Kaliman, Lio Matu and Long Ayap, Baram River, Sarawak, X.1920.

The description of this beautiful insect agrees precisely with the specimens before me, but I have not been able to consult Friese's monograph, to see if it still stands as a distinct species. Mr. H. M. Pendlebury tells me, however, that in the British Museum it is placed as a synonym of *M. ornata* Smith.

Genus **Dianthidium** Ckll.

9. **Dianthidium apice-pilosum** sp. nov.

Female: Head and thorax coarsely punctured with short pale ferruginous pubescence; clypeus ferruginous, finely punctured, roughly pentagonal, anterior margin transverse; mandibles dark ferruginous, blackish at apex; antennæ rufo-piceous, scape ferruginous; eyes light brown; mesonotum convex, with a medial longitudinal carina; scutellum not so coarsely punctured as the mesonotum, flat, overhanging the median segment, more or less lunate, broadly notched posteriorly, ferruginous, except for a triangular black marking in the middle anteriorly, margins posteriorly fringed with golden hairs; median segment considerably broader than long, very finely punctured with greyish, short, flat hairs arising from the punctures which covers the whole segment, except for a small finger-shaped area in the middle posteriorly which is smooth and shining and without hairs; abdomen finely and uniformly punctured, three basal segments brownish-black, more brown about the middle transversely, segments 4 and 5 more or less ferruginous with short pale golden pubescence, mixed with whitish on segment 5; segment 6 black, entirely covered with dense light grey hair, sides of segments 4 and 5 also with light grey hair; pollen brush ferruginous; anterior legs entirely dark ferruginous with short pale hairs, intermediate and posterior coxæ and femora, except for a dark stripe on the outside of the latter, dark ferruginous, tibiæ and basitarsi black with erect black hairs, apex of tarsi ferruginous with ferruginous hairs; wings dark brown at base, apical half clear hyaline, slightly iridescent; tegulæ dark ferruginous, very finely punctured, with a black spot in the middle.

Length. about 9mm.

Holotype from Khao Ram, Peninsular Siam, 750—1,200 ft., 24-11-1922 and one paratype from Gunong Angsi, Negri Sembilan, 2,000—2,790 ft., IV.1918 in the Raffles Museum. The paratype is a darker specimen than the holotype. This species is apparently closely allied to *Protoanthidium rufomaculatum* Cam. (*Journ. Str. Br. Roy. As. Soc.*, No. 37, p. 127, 1902) resembling it markedly in the apical abdominal pubescence, the wings, the puncturation, etc., but the top of the head and thorax is not thickly covered with rufofulvous hair, the intermediate and posterior legs are not entirely black, and the front legs have practically no black markings on them.

Sub-family ANTHOPHORINÆ

Genus **Anthophora** Latr.

10. A. himalayensis Rad.

1897. *Anthophora himalayensis* Rad., Bingham, tom. cit., p. 532.

1914. *Anthophora himalayensis* Rad., Meade-Waldo, Ann. Mag. Nat. Hist., (8), XIII, p. 57.

Gunong Angsi, Negri Sembilan, 2,000—2,700 ft.; Kuala Tahan, Pahang; Mt. Ophir, Johore.

11. A. himalayensis var. **pahangensis** M-W.

1914. *Anthophora himalayensis* var. *pahangensis* Meade-Waldo, loc. cit., p. 58.

Mt. Ophir, Johore, Kedah Peak, 3,200 ft.; Maxwell's Hill, Perak, 4,076 ft. Originally described from Gunong Tahan, Pahang, and doubtfully recorded from Mt. Ophir. The Mt. Ophir specimen mentioned by Meade-Waldo was one of the present series in the Raffles Museum, and there is no doubt that they belong to the variety *pahangensis*, though the typical form also occurs on Mt. Ophir. Meade-Waldo's variety is readily separated from the *forma typica* by the rufous pubescent fasciæ on tergites 1—3.

12. A. fulvohirta M-W.

1914. *Anthophora fulvohirta* Meade-Waldo, loc. cit., p. 51. Gunong Angsi, Negri Sembilan, 2,000—2,700 ft.; Kota Tinggi, Johore, Lundu, Sarawak. Meade-Waldo records it from Singapore, Kukub, S. W. Johore and Sandakan, Borneo.

13. A. hanitschi M-W.

1914. *Anthophora hanitschi* Meade-Waldo, loc. cit., p. 52.

The Raffles Museum has examples from the type-locality (Maxwell's Hill, 4,101 ft., Perak), and also from Mt. Ophir, Johore and Bukit Kutu, Selangor, 3,457 ft.

14. A. zonata Linn.

1924. *Anthophora zonata* Linn., Dover, Entomologist, LVII, p. 228, figs.

Singapore Island; Gunong Angsi, 2,000—2,700 ft., Negri Sembilan; Tebing Tinggi, Kelantan; Gurun, Kedah; Kota Tinggi, Johore; Semangko Pass, Selangor-Pahang, 2,750 ft.; Bukit Kutu, Selangor; Kuala Tahan, Pahang.

The taxonomy of the blue-banded bees of the *Anthophora zonata* group is in a very confused state, and in my paper I attempted to provide a working basis for their study. In describing yet another form from Samar, Philippine Islands, as a sub-species of *A. whiteheadi*, which I regard as a

Philippine form of *A. walkeri*, Cockerell and Le Veque (*Philippine Journ. Sci.*, XXVII, p. 171, 1925) remark that it does not appear probable that the blue-banded bees can be reduced practically to three species, on the color of the thoracic pubescence, adding that my dissections prove that the various forms I regard as sub-species, show structural as well as other differences. I do not think, however, that these differences are any more than would normally occur in a sub-species, and the thoracic pubescence is certainly a convenient character for separating the species, even though it may not provide a sure guide to affinity. It may be, however, that *whiteheadi* is a distinct species as Cockerell and Le Veque have treated it, but it may also be noted that they say that "Dover's contention that *whiteheadi* and *cingulifera* are sub-species of one species may prove valid".

I believe that in *A. zonata* and its allies we have found a very ancient species at present undergoing constant and gradual change, and any attempt to provide more than a working classification seems to me to be futile without a very large series of specimens from all parts of their geographical range, and without extensive ecological and experimental observations. The group is certainly one of unusual interest among the Apidæ, and would well repay a detailed study.

15. A. cingulata andrewsi Ckll.

1924. *Anthophora cingulata andrewsi* Ckll., Dover, loc. cit., p. 229, figs.

In the Raffles Museum from the Baram River, Sarawak.

This is a very puzzling form intermediate between *zonata* and *cingulata*, and it is difficult to indicate its taxonomic position. The specimens before me agree in every particular with Cockerell's description, but it is closely allied to *A. zonata*. Indeed, many specimens of *zonata* approach this form very closely, the white hair in the posterior tibiæ being lightly tinged with fulvous (typical *andrewsi* has distinctly fulvous hair on the posterior tibiæ, with greenish yellow metallic bands on the abdomen and bright fulvous hair mixed with black on the thorax), and the thoracic hair being also very similar to that of *andrewsi*. There is a specimen from Tebing Tinggi, Kelantan, which is almost identical with the Bornean specimens before me, except that the abdominal bands have no trace of yellow, and in my note I have recorded it from Penang, Singapore, and even from Allahabad, India, though I am now a little doubtful of the latter locality. This form, therefore, cannot be a sub-species of *A. zonata* as it occurs in the same localities as that species, and it seems to me natural to regard it as the oriental race of *A. cingulata.* We seem to have here a new species in the making, and further study will perhaps show that it should be regarded as specifically distinct.

16. A. walkeri cingulifera Ckll.

1924. *Anthophora walkeri cingulifera* **Ckll., Dover, loc. cit.,** p. 231, figs.

One example from the Baram River, Sarawak, which is identical with the Indian examples of *cingulifera* that I have seen.

17. A. borneensis Ckll.

1924. *Anthophora* (*zonata*) *borneensis* Ckll., Dover, loc. cit., p. 230.

There are three specimens in the Raffles Museum from the Baram River, Sarawak (12-18.IX.20, J. C. M.), which I believe I am right in identifying as the *A. zonata borneensis* of Cockerell, previously known only from the Spitang River, N. W. Borneo. It agrees exactly with Cockerell's brief description in all the characters mentioned by him though it is a little difficult to decide, without specimens for comparison, exactly what is meant by "dull and rather greenish mixed with black, giving a general blackish effect" for the color of the thoracic hair. In the specimens before me the individual hairs of the thoracic pubescence are greyish and black, giving a general greenish black effect. The tegulæ are of a dark, slightly lustrous, coppery color as mentioned by Cockerell. The tegulæ of the specimen I have identified as *cingulifera* are more or less piceous without any coppery lustre.

Prof. Cockerell originally described this form as a subspecies of *zonata,* but recently (*Philipp. Journ. Sci.* 27, p. 171, 1925) says that it should be called *A. whiteheadi borneensis,* but I do not think it is a sub-species of any of these forms. It is more closely related to *walkeri* and *cingulifera* than any other form, but if it were to be placed as a sub-species of *walkeri* that would invalidate *cingulifera* as a sub-species of *walkeri,* as *cingulifera* apparently occurs in the same locality. Perhaps Prof. Cockerell is right and *cingulifera* is specifically distinct from *walkeri,* with *borneensis* as a sub-species, but I cannot help thinking that *cingulifera* and *walkeri* are specifically identical, and that *borneensis* is specifically distinct. It is certainly very different from the form *whiteheadi.* If we were to regard *cingulifera* as specifically distinct, *whiteheadi* would have to be regarded as a form of it.

Sub-family XYLOCOPINÆ

Genus **Xylocopa** Latr.

18. X. fenestrata var. **iridipennis** Lepel.

1925. *Xylocopa fenestrata var. iridipennis* Lep., Dover, Ann. Mag. Nat. Hist. (9), XV, p. 222.

Singapore Island; Maxwell's Hill, Perak, 1,200 ft. This and the form following are referred to by Bingham and by Maidl in his monograph of the genus (*Ann. Nat. Hofmus. Wien*, XXVI, 1912) as distinct species, but they are almost identical with *X. fenestrata* in structure, the main difference being in the color of the wings, which seems to indicate the specific identity of the three forms.

19. X. fenestrata var. **auripennis** Lepel.

1925. *Xylocopa fenestrata auripennis* Lep., Dover, loc. cit., p. 222.

Fort de Kock, Sumatra, 3,000 ft. (E. Jacobson). Labelled by its collector as *X. splendidipennis* Rits.

20. X. collaris Lepel.

1897. *Xylocopa collaris* Lep., Bingham, tom. cit., p. 543.

Singapore Island; Semangko Pass, Selangor—Pahang; Gunong Angsi, Negri Sembilan; Tebing Tinggi, Kelantan; Gurun, Kedah; Bukit Lantai, Negri Sembilan; Matang and Baram River, Sarawak; Pontianak, W. Borneo. In my paper (*loc cit.*, p. 524) I have given a key to the Indian forms of *X. collaris*. Prof. Cockerell describes a Javan variety under the name *bryanti* in *Proc. U. S. Nat. Mus.* 55, p. 171, 1920, which is generally distinguished by the darker wings.

21. X. caerulea Fabr.

1897 *Xylocopa cærulea* Fabr., Bingham, tom. cit., p. 544.

Singapore Island; Pulau Ubin, near Singapore, Gunong Kledang, Perak; Gurun, Kedah; Kedah Peak, 3,200 ft.; Fort de Kock, Sumatra; Sœnda, Java.

22. X. aestuans Linn.

1924. *Xylocopa æstuans* Linn., Dover, Trans. Ent. Soc. Lond., p. 144, bionomics, etc.

1925. *Xylocopa æstuans* Linn., Dover, Ann. Mag. Nat. Hist. (9), XV, p. 223.

Singapore Island; Pulau Ubin; Tebing Tinggi, Kelantan; Gurun, Kedah; Khao Ronpibun, and Nakawn Sri Tamarat, Peninsular Siam; Fort de Kock, Sumatra; Sœnda, Java.

When I dealt with the bionomics of *X. æstuans* and other Indian carpenter-bees I did not know of a paper by Girault, with a biological note by Roepke, (*Treubia*, I, 2, p. 54 and p. 60, 1919), in which two species of the Chalcid genus *Epænasomyia* from the nests of *X. cærulea*, *æstuans*, and *tenuiscapa* are described. Dr. Roepke notes that these parasites occur in enormous numbers, and the effect of parasitisation is very similar to what I have observed in India in *X. æstuans*. Dr. Waterston referred the chalcids I collected to the family *Encyrtidæ*, and is, I believe, about to describe them. It may be that Mr. Girault's species are closely allied to the parasites I collected. In connection with the biology of *X. æstuans* it is interesting to note that Bhatia and Setna (*Parasitology*, XVI, p. 279, figs. 1—8, 1924) have described a new cephaline gregarinid under the name *Leidyana xylocopæ*, which parasitises *X. æstuans* in Lahore, India. A useful summary of our knowledge of the triungulins associated with carpenter-bees is given by C. T. Brues in *Zoologica*, V, No. 11, pp. 125—136, 1924.

In 1925 I indicated that the taxonomy of the yellow-haired carpenter-bees was in a very confused state, and that the name *confusa* Perez could not stand in place of *æstuans* A long series of specimens and a reference to the Linnean type of *X. æstuans* would greatly facilitate the nomenclature of this carpenter-bee and its allies.

23. X. tranquebarica Fabr.

1897. *Xylocopa rufescens* Sm , Bingham, tom. cit., p. 543, fig. 182.
1922. *Xylocopa tranquebarica* Fabr., Dover, Rec. Ind. Mus., XXIV, p. 87.

There are eleven specimens from Singapore Island. This is a crepuscular species, apparently very local in habitat Prof. Cockerell has pointed out that the name *tranquebarica* should be used for *rufescens*.

24. X. latipes Drury.

1897. *Xylocopa latipes* Drury, Bingham, tom. cit., p. 536.

Singapore Island, Pulau Ubin and Pulau Ayer Merbau near Singapore; Semangko Pass, Selangor—Pahang; Bukit Kutu, Selangor, 3,451 ft.; Pulau Tioman; Gunong Angsi, Negri Sembilan, 2,000 ft.; Tebing Tinggi, Kelantan; Gurun, Kedah; Gunong Kledang, Perak, 2,646 ft.; Lundu, Baram River and Saribas, Sarawak; Fort de Kock, 3,000 ft., Sumatra.

The females of the species are hard to separate from *X. tenuiscapa*. Maidl's monograph (*Ann. Nat. Hofmus. Wien*, XXVI, p. 294, 1912) should be consulted.

25. X. malayana Cam.

1901. *Xylocopa malayana* Cam., Proc. Zool. Soc. Lond., p. 32.

1903. *Xylocopa sarawakensis* Cam., Journ. Str. Br. Roy. As. Soc., No. 39, p. 180.

In the Raffles Museum from Matang, Sarawak; Bukit Kutu, Selangor, 3,457 ft.; Gunong Kledang, Perak; Kedah Peak, 3,000 ft.

Away from a type collection I find the synonymy of this species very confusing. Meade-Waldo (*A. M. N. H.* (8), XVII, p. 465, 1916, under *X. cærulea* var. *viridis* M-W) mentions that *X. sarawakensis* is the same as *X. malayana*, but had previously published (*A. M. N. H.* (8), XVI, p. 454, 1914) *X. malayana* as a synonym of *X. flavonigrescens* Smith, while Prof. Cockerell (*Entomologist*, LI, p. 104, 1918) so far as I remember (the paper not being obtainable here) indicates that they are distinct. The specimens before me are large, with olive-green pubescence, the thoracic pubescence more green, the bases of the abdominal segments 3—6 each with two transverse tufts of white hair towards the sides. They agree precisely with Cameron's description of *sarawakensis*, but not with *malayana* and *flavonigrescens* in which the thoracic pubescence is described as bright yellow. Cameron was so indifferent a worker, however, that these differences may not exist in his types and *malayana* and *sarawakensis* are in all probability synonyms of *flavonigrescens*. It would be very useful if some worker at the British Museum would publish the definite synonymy of these species after examining the types. As far as I remember the species recorded by me as *flavonigrescens* in the Indian Museum (*Rec. Ind. Mus* XXIV, p. 87, 1922) are nothing like the specimens before me now.

Sub-family BREMINÆ

Genus **Bremus** Jurine

26. Bremus rufoflavus Pendlebury.

1923. *Bombus rufoflavus* Pendlebury, Journ. F. M. S. Mus., XI, p. 66.

Summit of Gunong Berumban, 6,050 ft., and No. 4 Camp, 4,800 ft., "Cameron's Highlands". Pahang Mr. Pendlebury places his species under the old genus *Bombus*, but most apidologists now accept the name *Bremus* Jurine, which has a year's priority, according to Morice and Durrant (*Trans. Ent. Soc. Lond.*, 1914, p. 428).

There is also a long series of a closely allied form, which Mr. Pendlebury tells me he is about to describe as new.

Sub-family MELIPONINÆ

Genus **Trigona** Jurine.

27. T. collina Smith.

1897. *Melipona collina* Sm., Bingham, tom. cit. p. 562.

1923. *Trigona collina* Sm., Cockerell, Ann. Mag. Nat. Hist. (X), XII, p. 241.

Semangko Pass, 2,700 ft., Selangor-Pahang; Kedah Peak, 3,200 ft. Bingham's description is very poor, and without detailed descriptions Prof. Cockerell's excellent table of Malayan Trigonas (*loc. cit.*) is of little use in definitely determining the species. In the insects I have determined as *T. collina* it may be noted that the abdomen varies from being almost as long as broad to about twice as long as broad, but in all the specimens the segments are of a bright, polished brown color, except at the apices where they are darker and finely aciculate. The hind tibiæ also are conspicuously paler than the rest of the legs.

28. T. canifrons Smith.

1897. *Melipona canifrons* Sm., Bingham, tom. cit., p. 562.

1923. *Trigona canifrons* Sm., Cockerell, loc. cit., p. 241.

Two specimens from Singapore Island, agree in all particulars with the descriptions of this species.

29. T. thoracica Smith.

1897. *Melipona thoracica* Sm., Bingham, tom. cit., p. 564.

1923. *Trigona thoracica* Sm., Cockerell, loc. cit., p. 240.

Three specimens from Singapore Island and Kuala Tahan, Pahang.

30. T. kusutkana sp. nov.

Female or worker: A dark brownish species. Head and thorax indefinitely and inconspicuously punctured, almost opaque and smooth, with erect brownish black hairs arising from the punctures, the hairs longest on the vertex, the anterior margin of the mesonotum and sides of the thorax and the scutellum anteriorly; face with fine pale ferruginous pubescence, mixed on the clypeus with a few erect black hairs: antennæ ferruginous, outer side of scape and flagellum considerably darker, apical joint brown, first joint of the flagellum a little shorter than the second, the second a trifle longer than the others, except the apical joint which is cylindrical, bluntly rounded at the tip and about twice as long as the sub-apical joint; ocelli dark brown, closely set together almost in a line on the vertex, a short impressed line extending from the anterior ocellus to about half-way from the insertion of the antennæ raised, dark ferruginous, more or less triangular above, the point of the triangular portion meeting the impressed line from the ocellus; eyes pitch-black, inner orbital margins with a roughly lunate lighter ferruginous marking not quite touching the point of insertion of the antennæ, extending along the whole side of the face and meeting the point of a similar marking which extends round the top of the eyes from the cheeks, which are more or less entirely ferruginous and covered with very short pale pubescence with a few longer erect hairs; clypeus ferruginous, distinctly broader than long, more or less transverse anteriorly, emarginate posteriorly; mandibles dark ferruginous, black along the margins at the apex, inner side with a short triangular tooth, the apex sharp and pointed; mesonotum and scutellum very dark reddish-brown with a slight shine, the former more or less as long or a little longer than its maximum breadth, narrower posteriorly than anteriorly, convex, the latter broader anteriorly than posteriorly, more or less triangular and truncated posteriorly, over-hanging the median segment; median segment shining brown, convex, a little broader than long, with erect brownish hairs on the sides, abdomen more or less dark ferruginous, shining, scarcely punctured at all, first segment paler, second with a pale, yellowish transverse marking anteriorly which is broadest in the middle, much narrowed laterally, the extreme posterior margin of this marking edged with black, segments three or four conspicuously emarginated posteriorly, segment five with distinct tufts of dark hairs on the postero-lateral margins, segment six almost entirely covered with longish dark hairs, underside darker with a few rather long, erect black hairs; presenting a granular appearance, anterior legs ferruginous with more or less golden pubescence, the tibiæ with darker and longer hairs, the tarsi considerably darker than the other joints; intermediate and posterior legs of the same colour as the mesonotum, the femora lighter, with long, closely set black hairs which are most conspicuous on the rounded margin of the tibiæ; wings flavo-hyaline for the most part, almost clear hyaline at the apex; tegulæ dark ferruginous.

Length · 7—8 mm.

Habitat: Kedah Peak, 3,200 ft., December, 1915.

Holotype and one paratype from the same locality.

The paratype differs from the holotype in being generally lighter in colour on the head and thorax, the mesonotum anteriorly being conspicuously polished and shining, but the abdomen is darker with more black hairs on the apical segments. The characteristic marking on the second segment is present and well-defined.

This species has its nearest ally in *Melipona castanea* Bingham (*Fasc. Malay. Zool.*, II, *Appendix*, p. vi, 1903, and III, p. 59, Pl. A, figs. 10, 10*a*, 10*b*, 1906), but appears to be quite distinct. Bingham's description is very brief, discussing only the general coloration and distribution of the pubescence, but he mentions that the abdomen is broader than the thorax and about half as long as the head and thorax united, which is distinctly not the case in my species. His figure of *castanea*, though coloured, is not of much use for comparison, but his figures of the apical abdominal segments and the hind legs, show some structural difference from the same parts in my species. The hind tibiæ for example in *castanea* is not so prominently rounded on the outerside as in ***kusutkana***. The species is named ***kusutkana*** after the Malay word ***kusutkan*** (=confusing, perplexing) as the determination of its a nities was a perplexing problem owing to the poor descriptions of species of the genus *Trigona*.

Sub-family APINÆ

Genus **Apis** Linn.

31. A. dorsata Fabr.

1897. *Apis dorsata* Fabr., Bingham, tom. cit., p. 557.

1906. Apis dorsata Fabr., Buttel-Reepen, Mitl. Zool. Mus., Berlin, III, p. 194.

1906. *Apis dorsata* Fabr., Buttel-Reepen, Mittl. Zool. Mus., XXXVIII, p. 120.

Singapore Island; Horsburgh Light-house; Semangko Pass, 2,750 ft., Selangor-Pahang; Gunong Angsi, Negri Sembilan; Kota Tinggi, Johore; Mt. Ophir, Johore; Bukit Kutu, 3,457 ft., Selangor; Pulau Tioman; Gunong Kledang, 2,646 ft , Perak; Baram River, Sarawak. There are Indian specimens in the British Museum from Sikkim; Naga Hills and Khasi Hills, Assam; Salsette and Khandala, Bombay Presidency; Coonoor, S. India; Ceylon.

The three Indo-Malaysian honey-bees, *A. dorsata, A. mellifica indica*, and *A. florea* may be readily separated by their length, which in *dorsata* is about 16—18 mm., in *indica* 10—12 mm., and in *florea* 7—9 mm.

32. A. dorsata form **testacea** Sm.

1897. *A. dorsata* var. *testacea* Sm., Bingham, tom. cit., p. 558.

1906. *A. dorsata* var. *testacea* Sm., Buttel-Reepen, loc. cit., p. 295.

Singapore Island; Kedah Peak, 3,200 ft. This form is represented in the British Museum from Faridpur, Bengal; Andaman Ids.; Borneo; Sumatra; Penang; Cochin-China.

The forms of *A. dorsata* may be separated as follows:

Abdomen reddish-brown, segments 5 and 6, sometimes 3 and 4 dark brown or black..............*A. dorsata* **F. (typica).**

Abdomen pale testaceous yellow.........*A. dorsata* form *testacea* Sm.

Abdomen black with white bands on segments 3—5; thoracic pubescence black.........*A. dorsata* form ***binghami* Ckll.**

Abdomen with inconspicuous white bands on segments 3—5; thoracic pubescence rufo-fulvous.............. *A. dorsata* form *sladeni* Ckll.

The form *binghami* Ckll., (Canad. Entom. XXXVIII, p. 166, 1906) was described as a valid species. It is found mainly in the Celebes and Philippines, and is the *A. zonata* of Smith (Journ. Linn. Soc. Lond., III, p. 8, 1859, name pre-occupied). Cockerell's *sladeni* (*A. M. N. H.* (8), XIV, p. 13, 1914) was described as a sub-species of *binghami*, and is known only from the Khasi Hills. I regard both *binghami* and *sladeni* as forms of *A. dorsata*.

33. A. mellifica indica form peroni Latr.

1897. *A. indica* var. *nigrocincta* Sm., Bingham, tom. cit., p. 558.
1906. *A. mellifica* var. *peroni* Latr., Buttel-Reepen, loc. cit., p. 191.
1906. *A. mellifica* var. *peroni* Latr., Enderlein, loc. cit., p. 335.
1925. *A. mellifica indica form peroni* Latr., Dover, Ann. Nat. Hofmus. Wien., XXXVIII, p. 120.

Singapore Island; Gunong Angsi, Negri Sembilan; Bukit Kutu, Selangor; Kedah Peak, 3,200 ft.; Mt. Ophir, Johore; Gunong Kledang, Perak; Semangko Pass, Selangor-Pahang; Baram River, Sarawak.

There is much confusion in the taxonomy of the common Indian honey-bee. Bingham and Enderlein treat *indica* as a distinct species, while Buttel-Reepen makes it the Indian race of the common *A. mellifica*, and his opinions coincide with my own. Apparently the form *peroni* can be separated from typical *indica* as follows:

Abdominal segments 1—4 brownish-yellow...........*A. mellifica indica* (*typica*).

Abdominal segments 1—2, sometimes 1—4 brownish ochraceous with dark bands posteriorly...........*A. mellifica indica* f. *peroni*.

Going according to this key I do not remember to have seen any specimens of typical *indica*, either at the British

Museum, Indian Museum or elsewhere, all the specimens I have examined belonging to the form *peroni*. Bingham does not give any precise localities for *indica*, and exact records would be useful. On the basis of our present information it would appear that the form *peroni* should be treated as a valid variety of *indica*.

It is represented in the British Museum from Dehra Dun; Chitral; N. Khasi hills; Salsette, Nasik and Angim (Bombay Presidency), Calcutta; Mussoorie; Coonoor; Kandy, Maskeliya, Madulssima, Peradeniya and Trincomalee in Ceylon; Tenasserim; Borneo; Sumatra; Philippines; Formosa; China.

34. A. florea Fabr.

1897. *Apis florea* Fabr., Bingham, tom. cit., p. 559

1906. *Apis florea* Fabr., Enderlein, loc. cit., p. 337.

1906. *Apis florea* Fabr , Buttel-Reepen, loc. cit., p. 197.

This species is not represented in the collection of the Raffles Museum, but it occurs in Malaya, and I take this opportunity of publishing a few notes compiled at the British Museum. I find I have notes on the following forms:

forma typica. Represented in the British Museum from Nasik, Bombay Presidency; Batavia, Java.

form *rufiventris* Freise: Bangalore; Bombay (British Mus.); Tonkin. Type from Palawan Island.

form *fuscata* Enderlein: This form is at present known only from a single worker described by Enderlein (*loc. cit.*, p. 338) from "India". It is probably only an individual variation.

form *andreniformis* Smith · Trincomalee, Peradeniya, Kandy, Hambantota and Colombo in Ceylon (Brit. Mus.). Also recorded from Java; Sumatra; Siam; Kelantan.

form *sumatrana* Enderlein: Penang; Mt. Matang, Sarawak; Dambulla, Ceylon (Brit. Mus.).

form *nasicana* Ckll: Type from Nasik in the British Museum (cf. Cockerell, Trans. Amer. Ent. Soc., XXXVII, p. 241, 1911 for description). Also specimens from Bandra, Krohi, Salsette, and Angim (Bombay Presidency); Faridpur, Bengal; N. Khasi hills; Bangalore; Ataran valley, Tenasserim; Muscat: Arabia. This form is not very distinct from the *forma typica*.

The forms mentioned above may be separated as follows:

Abdomen brownish-black; basal two segments reddish-brown..*A. florea* (typica).

Abdomen more or less uniform ochraceous brown......... *A. florea* form *rufiventris*.

Abdomen, except segments 1 and 2, black... .... *A. florea* form *fuscata*.

Abdomen black, basal halves of first two segments dark red..........................*A. florea* form *andreniformis*.

Abdomen entirely black .....*A. florea* form *sumatrana*.

Abdomen black, segments 1 and 2 and basal half of 3, bright ferruginous .. ..*A. florea* form *nasicana*.

It might be mentioned here that *A. nursei* Ckll. (*A. M. N. H.* (8), VII, p. 319, 1911), which is a new name for *A testacea* Bingham (*J. B. N. H. S.*, XII, p. 129, 1898), was based on an unique specimen from Deesa, Bombay Presidency, characterised by its pale honey-yellow abdomen. The type was in Col. Nurse's collection, but was destroyed in removal. He says that it is undoubtedly a pale aberration of *A. florea*, and unless further specimens were forthcoming, I would not consider the name worth retaining, even as a varietal one.

The above notes indicate how imperfect is our knowledge of the Indo-Malayan honey-bees.

Contrary to the opinion of some entomologists, I believe that apiculture in the Indo-Malayan region could be developed into a profitable minor industry, yielding a considerable revenue Those who are of this opinion may find the works of Hooper (*Agric Ledger*, No. 7, 1904), Ghosh (*Bull-Agric Inst. Pusa*, No. 46, 1915 and *Rep. 3rd Ent. Meet. Pusa*, II, p. 770, 1920), Newton (*Agric Journ. Ind.* (XI), p. 44, 1917) and Sladen (*Bull.* No. 26, *Dept. Agric., Dominion of Canada*, 1916) very useful in their apicultural efforts. It might be pointed out that experimental work on honey-bees has not received all the attention it deserves in Indo-Malaya data such as the relative importance of the various plants which supply honey to the bees, are woefully scanty (cf. Burkill, *Journ. As. Soc. Beng.* (n.s.), VI, p. 105, 1910). The discovery of a Tarsonemid mite in the tracheal tube of bees from the Isle of Wight is interesting, and should serve as a warning for the need of careful selection in importing foreign bees into India (cf. Rennie, White and Harney, *Trans. Roy. Soc. Edin.* ,LII, pp. 739—779, 1921; Hirst, *A. M. N. H.*, (9), VII, p. 509, 1921).

Honey-Bees in the Federated Malay States Museums

In connection with the remarks on honey-bees in the preceding pages, the following list of the honey-bees in the F. M. S. Museums at Kuala Lumpur will be found to have some interest. Most of the specimens have been collected by Mr. H. M. Pendlebury.

1. Apis dorsata Fabr. (typical form).

Selangor: Kuala Lumpur (common in all months); Gombak Valley near Kuala Lumpur; Bukit Kutu, 2,500 ft.; Klang; Kuala Selangor; Kuala Kubu; Kuala Pilah; Ginting Bidai, 2,000 ft.

Pahang: Gunong Tahan Padang, 5,550 ft.; Lubok Tamang, 3,500 ft.

Perak: Jor Camp, 2,000 ft.

Johore: Lubok Kedondong, N. W. of Mt. Ophir, Lalang and Beluka, 200 ft.

Peninsular Siam. Khao Luang, 5,800 ft. and Khao Ram, 750 ft.; Nakon Sri Tamarat; Nowonse, Patalung.

2. Apis dorsata form **testacea** Sm.

Selangor: Kuala Lumpur; Kuala Selangor; Klang.

Kedah: Kedah Peak.

Perak: Taiping ("At light").

Pahang· Gunong Tahan, 4,900 ft.

The records indicate that *A. dorsata* and its var. *testacea* are widely distributed in the Malay Peninsula, *testacea* being the rarer insect. Both forms often come to light

3. Apis mellifica indica form **peroni** Latr.

Selangor. Kuala Lumpur (not as common as either *A. dorsata* or *A. florea*); Bukit Kutu, 3,000 ft.

Pahang: Wray's Camp, Gunong Tahan, 3,300 ft.; Gunong Tahan Padang, 5,500 ft.; Gunong Benom, 6,000 ft.; Lubok Tamang, 3,500 ft.; Kuala Lipis; Kuala Teku, 500 ft.

Perak: Batang Padang, Jor Camp.

Peninsular Siam: Khao Ram, 750 ft. and Khao Luang, 2,000 ft., Nakon Sri Tamarat.

Java. Papandajan, 5,500—7,000 ft., Preanger Regency.

Borneo: Brunei.

From the very large series of this form in the F. M. S. Museums both Mr. Pendlebury and I are quite unable to pick out a typical specimen of *indica* as defined by Buttel-Reepen. Mr. Pendlebury thinks that the form *japonica* Rad., which I have not seen, is very similar to *peroni*.

4. Apis florea Fabr. (typical form).

Pahang: Rhododendron hill, 5,300 ft., "Camerons Highlands".

Perak: Batang Padang, Jor Camp, 1,800 ft. ("a nocturnal insect").

There are only two examples of the typical form in the F. M. S. Museums, and four of the very curious fly-like males from Kuala Lumpur, July, 1924, which were described by Smith as *A. lobata.*

5. Apis florea form **sumatrana** Ender.

Selangor: Kuala Lumpur.

Pahang: Kuala Tahan, 300 ft.; "Camp No. 4, "Cameron's Highlands" 4,000 ft.

Perak: Batang Padang, Jor Camp, 1,800 ft.

This is the commonest bee in Kuala Lumpur, being found in very large numbers about the flowers of the Honolulu, or Straits, creeper. In fresh specimens the abdomen is contracted. Enderlein must have had before him examples with contracted abdomens. which led him to describe the abdomen as entirely black. Many of our specimens have a short transverse reddish marking on the second abdominal segment, but though this character in constant in a large number of examples, I have not thought it worth while to separate them. The specimens before me establish the validity of Enderlein's form, but prove that it has no claim to sub-specific rank.

6. Apis florea form **rufiventris** Friese

Selangor: Kuala Lumpur.

Mr Pendlebury has identified this specimen as *andreniformis,* but I think it is nearer *rufiventris,* as the abdomen is more or less ochraceous brown. The fact that these forms are almost impossible to identify with certainty indicates their doubtful validity.

7. Apis florea form **andreniformis** Smith.

Pahang: Lubok Tamang, 3,500 ft.

According to my key this insect is the true *andreniformis,* having the basal halves of the first two segments dark red.

8. Apis florea form **nasicana** Ckll.

Selangor: Kuala Lumpur.

This specimen was caught on the same plant at the same time as the form *sumatrana.* It runs in my key to *nasicana,* having the first two abdominal segments and the basal half of the third, more or less ferruginous. It seems to be distinct from the typical form, but is certainly no more than an occasional variety produced in a brood. It has not previously been recorded from any locality south of Tenasserim.

In concluding I would emphasize the fact that if workers in various museums, publish a detailed analysis of the honey-bees in their collections, giving locality records, noting variations, etc., in some easily accessible journal, we may eventually be able to assign a more definite taxonomic value to the various forms of this plastic genus.

[Col. C. G. Nurse, the well-known student of Indian Hymenoptera has very kindly sent me some notes on *Apis*, which it seems worth while to add as an addendum to this paper.

Notes on Honey-Bees

I agree with Mr. Dover in considering that there are only three well defined species of *Apis* in India, *viz. dorsata* F., *mellifica* L. (Bingham calls this *mellifera*) and *florea* F. These have of course varieties and local races.

A. nursei (originally determined as *A. testacea* by Bingham from a specimen or specimens he received from me) is undoubtedly merely a pale variety, or perhaps immature specimen of *A. florea*. The type was in my possession, but was hopelessly damaged when my collection was moved from India. *A. florea* at Pusa was very pale. I think *nursei* may safely be deleted as a species.

Both *A. dorsata* and *A. florea* frequently work at night at Pusa. I have seen them working between 10 and 11 p m. It is curious that at Pusa *A. florea* is never to be seen in October, when other bees are very numerous. It appears in November when there are very few flowers left —*C. G. Nurse.*]

Notes on the Preimaginal Stages of two Malaysian Hymenoptera

By CEDRIC DOVER

1. **Eumenes maxillosus** var. **circinalis** Fabr.

The ethology of *Eumenes maxillosus* and its several varieties has been studied by several observers, and a bibliographical summary is given by Dr. J. Bequært in his admirable work on the Vespidæ of the Belgian Congo[1]. It seems to be very similar in all the forms. Maindron[2] has noted the nesting habits of the species discussed here, but I have not been able to consult his paper.

Though the ethology of many wasps has been described, the larvæ and pupæ of very few species are known. This is to be deplored, as I think that a knowledge of the structure of the preimaginal stages of *Hymenoptera* would have much taxonomic value, especially in closely related forms like *E. maxillosus* and its varieties. Indo-Malayan *Hymenoptera*, and this note is published to encourage their collection and description by local students.

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[1] Bull. Amer. Mus. Nat. Hist., XXXIX, pp. 65—67, 1918.

[2] Ann. Soc. Ent France, (6), II, p. 172, 1882.

The nest from which my larva and pupa was collected was about five inches long with five chambers, the chamber at each extremity rounded and large and not covered over. The three chambers in the body of the nest were lined with parchment and the openings closed with the same material. The rounded bottom chamber contained a rod-shaped egg about 4 mm. long, and a green butterfy caterpillar which had been stored alive by the parent wasp as food for the future larva; the next chamber contained a nearly full grown larva, the next a pupa, the next an imago which had not yet freed itself from the pupal skin, and the last a full-grown imago which was more or less ready for flight. The nest was composed of clay, the inner portion being smooth and flat, the edges raised, the outer portion rounded and not at all even. The larva is a little over 20 mm. in length, and is of a dirty cream color, the posterior half shaded with blackish-grey; body wrinkled; segments more or less of equal size, except the first which is very narrow; spiracles placed towards the anterior end of each segment on the sides of segments 2—11 inclusive; head smooth and shining, indistinctly longitudinally carinate on the vertex with an oblique, inwardly directed groove on each side of the face about the middle; towards the anterior margin there are two ocelli nearly twice as far away from each other as they are from the extreme edge of the head; between these ocelli and a little above them are two closely set pits, and just above each ocellus there is also a shallow, indistinct depression; clypeus very much broader than long, posterior margin rounded, anteriorly roundly toothed; labrum in two bean-shaped lobes below; mandibles two-jointed, basally very much broader than long, triangular towards the apex, which is strongly chitinised, with three sharp teeth visible from above; labium squarish, convex, slightly emarginate above, somewhat rounded at the sides and below, indistinctly longitudinally grooved, and apparently with a few irregular tiny tubercles, a brownish palp on each side above towards the sides; maxillæ broad and rounded at their apex, narrower at base, with the palpi in the middle at the extreme apex; no legs.

The pupa is of a dirty creamy-yellow color, and shows all the imagine structures through the thin enveloping caul; eyes black; inter-antennal space not distinctly raised as in adult, and clypeus only very slightly convex, the latter shaped as in imago otherwise, but finely and transversely striate not punctured; mandibles as in imago, little darker than the clypeus; antennæ very pale, joints visible but not very distinct, bent forward over the clypeus and mouth-parts and extending to the base of the petiole; mesonotum and scutellum distinctly longitudinally grooved with traces of fine, transverse striation, not coarsely punctured as in adult, the former with a distinct circular elevation in the centre reminiscent of a papilla or sucker, greyish-black, except for two triangular creamy markings antero-laterally, this marking being very similar in shape to that in the imago, and provides a good character for recognising the pupa as that of *circinalis;* the scutellum is unmarked: the sides of the thorax in the adult have a black stripe extending downwards from in front of the tegulæ, which is also distinguishable in the pupa; petiole broad and flat, with a greyish-black marking medially above; basal two abdominal segments above blackish, the rest pale; wings small and narrow, with an outer flavo-hyaline sheath enclosing a soft white pulp; legs unmarked; size about the same as that of the imago.

ii. **Eumenes caffer** var. **esuriens** Fabr.

The following descriptions of the larva and pupa of *Eumenes caffer* var. *esuriens* Fabr., are intended to supplement our knowledge of the life-history of this wasp.[1]

The egg is rod-shaped, as in other Eumenids, and is about 2·5 mm. in length. It is enclosed in a transparent membranous case, the actual body of the egg, which is cream coloured, being a little smaller than the whole structure.

The full grown larva is of the general Eumenid type and coloration (dirty cream or pale flesh color), and is about 12 mm. long by 5 mm. broad. The segmentation is very distinct, the individual segments being more or less equal in size. The spiracles are as in *E. maxillosus* var. *circinalis.* The head is rounded, slightly broader than long, with an indistinct longitudinal groove: an oblique groove on each side of the face marks the inner orbital margins of the future eyes, between these grooves there is a row of four shallow pits extending almost in a straight line, the two centre ones being situated close together; below each lateral pit there is an "ocellus", which is really the antennal bud; the clypeus is roughly rectangular, about twice as long as broad, posterior margin somewhat rounded, sides parallel, anterior margin almost transverse; the labrum is in two bean-shaped lobes below, much as in *E. maxillosus* var. *circinalis;* mandibles short and broad, divided at apex into three short, obtuse teeth; labrum convex, broader above than below, upper margin transverse, lower margin rounded, palps situated near the upper margin towards the sides; maxillæ elongate, medially constricted, broadest at apex, palps situated about the middle at the apical margin.

The pre-pupa is similar to the larva, but differs in that the segmentation is not distinct, and the legs and wings, enclosed in their hypodermal sacs, may be clearly distinguished. The head is deeply depressed longitudinally as the result of internal changes,

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[1] Horne, Trans. Zool. Soc. London, vii, 3, p. 166, 1870; Dutt, Mem. Dept. Agric. Ind., Entom. ser., iv, 4, p. 220, 1912; Roubaud, Ann. Sc. Nat Zool., (io), 1, i, p. 60, 1916.

and the antennal and ocular buds may be clearly distinguished through the transparent skin. The mouth-parts are substantially the same as those of the larva. The joints of the legs (except the tarsal joints) are differentiated and the tibial spur is very prominent. The wing-pads are brownish structures lying closely pressed to the body; the tracheation is not very clearly visible. The development of the median segment gives the body a constricted appearance about the middle.

The pupa before me is in a very early stage and is entirely yellowish white in colour, except for a brown tinge on the wing-pads. Its length stretched out is about 15 mm. The adult structures are visible, but are still very soft and flaccid, even the mandibles being fleshy and pale in colour. The eyes and ocelli are not very distinct. As it would not be possible to identify so early a stage with certainty it is not described in full. Older pupæ no doubt would show some of the characteristics of the adult, making their certain identification a simple matter.

Malaysian King-Crabs

By N. SMEDLEY, *M.A.*

(with four text-figures)

A recent study of King-Crabs obtained from the coasts and waters of the Malay Peninsula and from Borneo has enabled me to supplement the observations of Annandale (1909) and others on these interesting relics of an archaic fauna. The bulk of the material is in the collection of the Raffles Museum, and of the Selangor Museum, Kuala Lumpur. Much of it has been brought in by the Government experimental trawler and was collected by Mr. W. Birtwistle, Fisheries Economist. I am also indebted to Mr. E. Banks, Curator of the Sarawak Museum, and others for several interesting specimens.

The classification adopted is that of Pocock (1902). It has many disadvantages. Shipley, in 1909, criticising it said, "It will be noticed that in his classification the generic name *Limulus* has disappeared. I have, however, retained it in this article, partly because I regard the name as so well established that every one knows what it denotes, and partly because in a group which contains confessedly very few species, differing inter se comparatively slightly, it seems unnecessary to complicate matters with sub-families and new names." I agree with this criticism in its entirety, but as any attempt to re-establish the name *Limulus*, and at the same time to bring the whole group once more within its more reasonable bounds as a single genus would necessitate delving into literature which is not at the moment accessible, I leave the matter for the present[1].

Three species, belonging to Pocock's sub-family *Tachypleinæ*, are known from Malaysia. Their names and distribution are given below.

1. *Tachypleus gigas* (Muller), the Indo-Papuan King-Crab, ranging as far west as the Bay of Bengal, and east to the Torres Straits.

2. *Tachypleus tridentatus* (Leach), the Chinese King-Crab, off the coast of N. Borneo, where it is found side by side with *T. gigas*, and north as far as China and the south of Japan, but not recorded so far west as the Malay Peninsula. Essentially a northern form.

3. *Carcinoscorpius rotundicauda* (Latr.), the Estuarine King-Crab. This species has a wider range than its estuarine nature would suggest, occurring as it does in India, around both coasts of the Malay Peninsula as far as the Gulf of Siam, and reappearing in Borneo, the Moluccas and Philippines.

Even amongst scientific workers it is quite usual to find the belief that only one species of King-Crab (*Limulus moluccanus* = *Tachypleus gigas*) is found around these shores. It is therefore of great interest to discover that the Malays recognise the distinction between *Tachypleus gigas* and *Carcinoscorpius rotundicauda* and know them by different names. Mr. A. W. Hamilton has kindly acquainted me with the names used in Singapore which are.—

"*belangkas*" — *Tachypleus gigas*
"*kĕroncho*" — *Carcinoscorpius rotundicauda*

The term "belangkas" is also in use in the Peninsula, where, however, "*belangkas padi*" replaces "*keroncho*" for the smaller species. The name *belangkas* is given by Winstedt (1922) as "King-Crab", *kĕroncho* as the young. The smaller size of *C. rotundicauda* may be the cause of this use of the term. The largest specimens of *Carcinoscorpius* that I have seen were about four or five inches across the carapace, and only a close examination or a knowledge of their habits would reveal the fact that they were not juvenile *Tachypleus gigas*. The eggs, *telor belangkas*, are greatly esteemed as a delicacy, especially by women during pregnancy, according to a Malay informant. From another source I learn that the King-Crab is regarded by strict Mohamedans as "haram", but that liking often discounts the religious ban.

The characters in which these species vary have been clearly set forth by Pocock, but the following additional observations seem worthy of note. *Tachypleus gigas* grows to a length of about 500 mm., and though the relation of the caudal spine to the total length is variable, it is roughly a half. A female specimen of *Tachypleus tridentatus* in the Raffles Museum has a total length of 745 mm. The caudal spine is incomplete, but appears to have been approximately half the total length. In *Carcinoscorpius rotundicauda* the total length of the adult is about 335 mm. The caudal spine is relatively longer than in *Tachypleus* in all the specimens which I have examined. This feature might therefore be used as an argument for separating *Tachypleus* from *Carcinoscorpius*, but I should prefer to regard the distinction as sub-generic.* In the Selangor Museum are a ♂ and ♀ *C. rotundicauda* which were taken in copulation and may therefore be regarded as fully adult. In both sexes the moveable spines gradually decrease in size until the last is as short as that of the female *T. gigas*. The ♂ of this pair and another male both have fully chelate claspers but may be recognised by the greatly swollen propodites of the first two pairs of legs. (Fig. 1). Lyddeder, (1896), referred to the swollen appendages of the ♂, but Pocock omits mention of it (in the text, although his figure seems to exaggerate the general difference in form between the ♂ and ♀ appendages).

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[1] Since I wrote the above the International Commission on Zoological Nomenclature has decided the name *Limulus* shall stand in place of *Xiphosura*, the generic name for the American species. (Opinion No. 104).

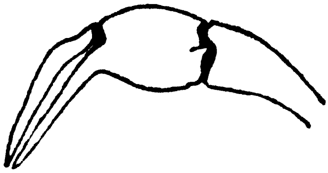

Fig. 1.—*Carcinoscorpius rotundicauda*. Propodite

Aberrations are common in the group, judging from the percentage amongst the specimens I have seen. Some of them may be related to growth, others to sex differentiation, secondary characters usually associated with one sex appearing in the other, a phenomenon not uncommon in other phyla. The Raffles Museum possesses a specimen of *Tachypleus gigas* measuring about 330 mm in length. The last few joints of the thoracic appendages are missing, but judging by the fact that the moveable spines bordering the opisthoma are long it may be suggested that it is a male. (The shortening of the spines in the female is usually completed before the animal reaches this size) It differs from Pocock's description of the sub-family in having no spike on the lateral crest bordering the gill-chamber on the ventral surface of the opisthoma. This spike is also absent in all my immature specimens of *Carcinoscorpius rotundicauda*, but is present in the adults both of this species and of *Tachypleus gigas*, in varying degrees of strength quite unrelated to the age or size of the specimen. Another undoubted male of *Tachypleus gigas* possesses a notable peculiarity. (Fig. 2). The fourth of the moveable spines on either side of the opisthoma is extremely short and truncate, as in the female, but the remainder are of full length. The claspers of this specimen are of the typical hemichelate form. (Fig. 3)

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* This was apparently also the view taken by Annandale (loc. cit.), but it is open to doubt whether the name *Carcinoscorpius* is valid even as a sub-genus, even if *Limulus* is accepted as the generic name.

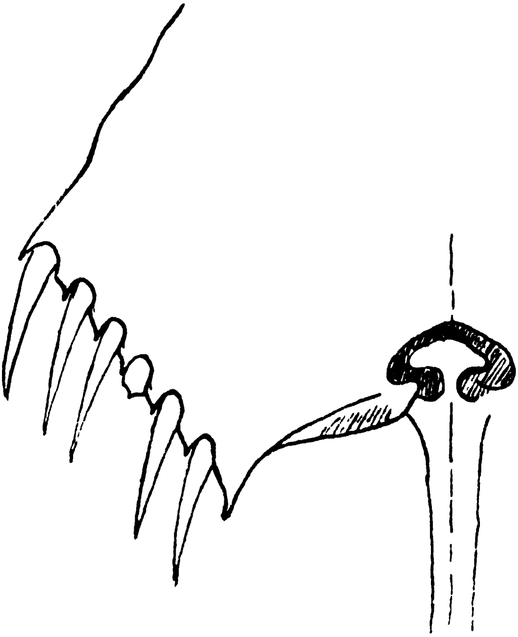

Fig. 2.—*Tachypleus gigas*: Aberrant ♂

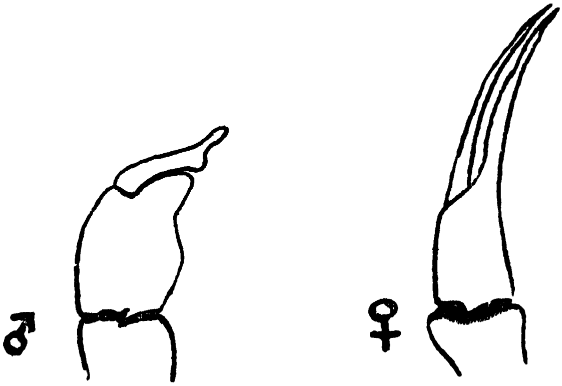

Fig. 3.—*Tachypleus gigas*: Male and female appendages

Partial regeneration of lost parts occurs, but not, apparently, to the same extent as in Crustacea. One fully mature ♀ of *T. gigas* has had the angle of the prosoma torn away. (Fig. 4).

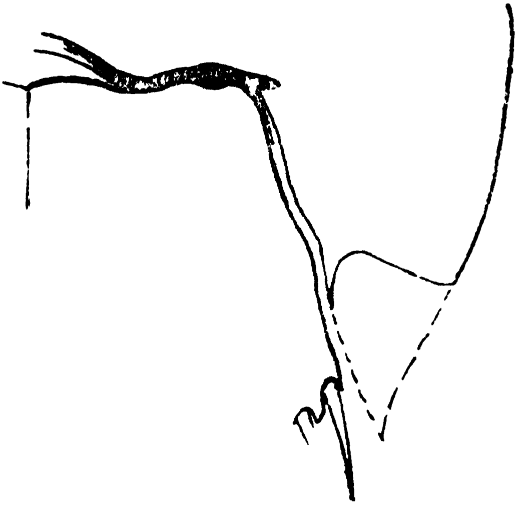

Fig. 4.—*Tachypleus gigas*: Regeneration

The broken edge has healed and a new and perfect spine has been formed, but at the inner extremity of the wound and not at the outer as might be expected; a similar case occurs in a ♂, the raised margin being also reproduced along the healed surface. Several other specimens of the same species have lost spines both moveable and fixed from the margin of the opisthoma; in every case the wounded surface has entirely closed and healed without regeneration of any of the spines. Similar cases occur in *C. rotundicauda*.

Annandale speaks of *Limulus moluccanus* (= *Tachypleus gigas*) as essentially a marine form. This is borne out by the specimens before me, although his statement that the species is to be found from the tide-line to a depth exceeding 20 fathoms needs modifying. Most of the specimens from the waters of the Malay Peninsula were obtained at a depth exceeding 20 fathoms. They were taken by the trawler "Tongkol", which usually fishes in slightly deeper water (about 30 fathoms) in order to avoid coral debris. The presence of coral may tend to drive the animal to deeper water where it can find a sandy or muddy bottom, but the fact that it is occasionally met with on the beach tends to show that it may dwell as high as the tide-line where conditions are favourable and coral is lacking. It presence probably cannot be accounted for on the supposition that it comes inshore to breed as neither this species nor *rotundicauda* buries its eggs as do the American and Chinese forms, but carries them about attached to the swimmerets.

Tachypleus tridentatus is of such great size that it is most probably to be found usually in the deeper water, but little is known of this rare species. Shipley quotes an account by Kishinouye of oviposition, which apparently takes place between tide-marks.

The third species, *Carcinoscorpius rotundicauda,* is said by Annandale to be mainly if not entirely estuarine. He records the fact that it is found at Calcutta, up the Hooghly river, about 90 miles from the open sea. I have specimens from Singapore; Morib, near the mouth of the Langat River on the West Coast of the Peninsula; Mersing, at the mouth of the river of that name on the East Coast; and Kuching, Sarawak, Borneo, all estuarine localities. I have picked up specimens on the beach at some distance from the river mouth at Mersing but none were living. The wide range of distribution of the species must be attributed to its great age.

Key to Malaysian species (only):—

1. Caudal spine smooth ....*Carcinoscorpius rotundicauda.*
   Caudal spine serrated dorsally (*Tachypleus*) 2

2. Margin of opisthoma at root of caudal spine armed with three teeth ....*Tachypleus tridentatus.*
   Margin of opisthoma at root of caudal spine armed with a single tooth ....*Tachypleus gigas.*

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Note

Spolia Mentawiensia

I have prefaced the study by Dr. R. Hanitsch of the Blattidæ obtained from the Mentawi Islands off the West Sumatran Coast with some account of the group and the visit paid to it during October and November 1924, by Dr. H. H. Karny of the Buitenzorg Museum, Mr. N. Smedley of the Raffles Museum and myself; and with a list of the fifteen reports previously published on our collections.[1] Therein I omitted to note that during our journeys to and from the group a few insects and other invertebrates were obtained on the Pagi Islands, also belonging to the Mentawi group, from the Batu Islands, a shallow-water group to the north of Siberut and also from the neighbourhood of Padang, West Sumatra.

More reports are given here: a considerable amount of material still remains awaiting determination in the hands of systematists. — *C. Boden Kloss*

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[1] Bulletin of the Raffles Museum, No. 1, Sept. 1928. For a fuller discussion of the zoological position of the Mentawi Islands *vide* P. Z. S. 1927, pp. 797—807

Spolia Mentawiensia

Tenebrionidæ

by K. G. Blair

The present paper is based upon one of the collections made in the Mentawi Islands off the west coast of Sumatra by Messrs. C. Boden Kloss, N. Smedley and H. H. Karny.[1] It is only with considerable diffidence that I have undertaken the task, since this family of beetles, particularly from this part of the world, has long formed the special study of my honoured colleague, Herr Hans Gebien of Hamburg, whose admirable work "Die-Tenebrioniden des Indo-Malayischen Gebietes" is now in course of publication. It is unfortunately but too probable that some at least of the species here described as new may be identical with species of which descriptions as yet unpublished may have been prepared by this much more competent author. It is possible also that some of the forms now treated as new may prove eventually to have been already named by M. Pic. Though I believe that I have recognised some of this author's species among the material now before me, there may be others that I have failed to identify from his very brief and widely scattered descriptions.

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[1] *Vide* Bull. Raffles Mus., No. 1, Sept. 1928, pp. 2—4.

1. **Bradymerus clathratus**, Schauf. 1 ex. Siberut.

Type locality Macassar; represented in the British Museum by examples from Penang, Java, Borneo, the Philippines and the Andaman Islands.

2. **Ceropria superba**, Wied. 1 ex. Siberut.

Fairly widely distributed: from Java and Borneo to S. China and Assam.

3. **Leiochrinus testaceus**, Westw. (?) 2 ex. Siberut.

Both examples are very defective.

4. **Leiochrodes suturalis**, Westw. 3 ex. Sipora. 2 ex. Siberut.

Described from Amboina, its range appears to extend from New Guinea to Perak and Selangor in the Malay Peninsula.

5. **Leiochrodes rufofulvus**, Westw. 1 ex. Sipora. 1 ex. Siberut.

Described from Celebes, the British Museum possesses examples from Java, Sumatra, Perak, Burma and Assam.

6. **Leiochrota glabrata**, Walk. 2 ex. Sipora

With type from Ceylon, the species occurs also in Sikkim, thence through the Malay Peninsula to Sumatra and Borneo.

7. **Uloma picicornis**, Fairm. 1 ex. Siberut.

Occurs throughout Sumatra, Java, Borneo, the Philippine Is., and northwards to Laos.

8. **Uloma orientalis**, Cast. 1 ex. Siberut. 2 ex. Sipora.

Another widely distributed Oriental species.

9. **Uloma triemarginata**, sp. n.

Elongate, somewhat depressed, nitid, castaneous; head in the ♂ very finely and sparsely punctate, and broadly but not deeply excavate between the eyes, the clypeus truncate in front, with the anterior edge thickened and strongly reflexed, its angles obtuse, but definite. Antennæ stout, 3rd joint about as long as wide, 4th to 8th increasingly wider, 8th to 10th about three times as wide as long. Mentum cordiform, flat, finely and sparsely punctate. Thorax wider than long, widest near front margin, disc finely and sparsely punctate, base not bordered; apex in ♂ triemarginate, the declivity short but steep, the middle emargination about twice as wide as the two lateral, with a pair of small tubercles in the middle at the crest of the declivity. Elytra parallel-sided for about two-thirds of their length, as wide as the base of the thorax, the striæ sharply cut, rather finely and not closely punctate, the intervals feebly convex, more strongly so towards the sides; the lateral carina is invisible from above except just behind the shoulder and again at the apex. Anterior tibiæ slightly arcuate, not emarginate on inner side at base, outer side sharply dentate.

In the ♀ the head is more rounded in front, widely depressed along the clypeal suture, with the frons more strongly punctate; the thorax lacks the excavations above the anterior margin. Length 9 mm. 4 ♂♂, 12 ♀♀ from Sipora Id. (C.B.K., N.S. and H.H.K.). 1 ♂ Siberut Id. (H.H.K.).

In form more closely resembles *U. picicornis*, Fairm., than any other species known to me, but at once distinguished by the peculiar thoracic structure of the male, and the much stouter antennæ. The female is separable from that of *U. picicornis* by its much more depressed form, the broad front of the thorax, and the flatter elytral intervals As is usual in this genus, in a small male the sexual characters of the head and thorax will be much less strongly developed than in a large one.

10. Encyalesthus æruginosus, F. Siberut. 1 ex. (H.H.K.).

With type locality Java, it occurs also in Borneo and Sumatra, the Malay Peninsula, Siam and Tonkin.

11. Necrobioides sulcaticollis, Fairm. Siberut. 1 ex. (C.B.K. and N.S.).

The single example differs a little from typical Bornean specimens in the thorax and elytra being similarly coloured, coppery-æneous.

12. Artactes apicalis, sp. n.

Shortly ovate, very convex, nitid, head and thorax piceous with purple reflections, elytra blackish æneous on dorsum, passing gradually through æneous, purple, violet, blue to greenish on shoulder and along outer apical margin. Elytral epipleuræ, underside and legs brownish.

Head almost impunctate, non-carinate, eyes separated by a distance about twice as great as the width of one of them. Thorax finely, rather obsoletely punctate, the sides not very strongly rounded, anterior angles blunt, anterior border interrupted in middle; posterior angles really obtuse, rounded but depressed and covered by base of elytra, the apparent posterior angles being acutely rectangular. Elytra a little longer than together wide, seriate punctate, the punctures moderately large and distant, becoming finer and eventually obsolete behind and on the shoulder; intervals feebly convex, practically impunctate; the lateral margin sharply defined by a deep sulcus which fails to reach the apex, of almost even width throughout, scarcely wider at the shoulder, epipleur almost flat, horizontal, feebly hollowed beneath shoulder. Length: 7 mm.

Mentawi Ids., 1 ex., No. 187 (H.H.K.).

Rather less hemispherical than most of its congeners, and differing markedly in the horizontal epipleuræ of the elytra. Probably related to *A. marginicollis*, Fairm., and *A. tristis*, Gebien.

13. Hemicera splendens, Wied. 50 ex. from Sipora and Siberut.

Though most of the series exhibit fairly typical iridescent bands of colour, a few show some interesting variations from this normal: *e.g.*, the median band of green or blue running from behind the shoulder along the 5th interval normally is about limited by this interval, but exceptionally may expand to cover the intervals from the 3rd to the 7th, pushing, as it were, the succeeding colours outwards; on the other hand, it may fail to develop, leaving the median portion of the disc entirely coppery. Considerable variation in size is also exhibited (5 mm. to 9 mm. in length).

14. Hemicera fulgurans, sp. n.

Similar to *H. splendens*, Wied., but smaller and differently coloured. Head and thorax dark almost black, with uniform æneous reflections, finely and sparsely punctured as in *H. splendens*, the interspaces not alutaceous. Elytra brilliant, the sutural interval blue, the next brassy, the greater part of the disc coppery purple, changing externally through æneous and green to a dark blackish green along the side margin; striæ rather finely but irregularly punctured; intervals nearly flat, finely and sparsely punctate, with the interspaces not alutaceous; first and second striæ a little deeper towards apex. Underside reddish piceous, with slight æneous reflections on metasternum, on the last three segments of the abdomen and on the femora; the first three abdominal segments rather finely and closely strigose, the last two almost impunctate. Length 4½ mm.

Siberut, 1 ex., No. 137 (H.H.K.).

15. Hemicera sexmaculata, Gebien, var. **octomaculata** nov.

Differs from the typical form in the sub-apical yellow spot on the elytra being divided into two. 3 ex Sipora, 1 ex. Siberut

These examples from the Mentawi Islands have the elytra brownish black in colour, though others in the British Museum from Borneo exhibit more or less strong purple reflections. Occasionally the two sub-apical spots are confluent, thus merging into typical *H. sexmaculata*. This purplish form has also been received from Medan, east coast of Sumatra, 9-1-1921 (J. B. Corporaal) (Type of the variety).

16. Platycrepis elongatus, Pic., Mélanges exot. ent. fasc. 35, 1922, p. 23.

Eleutheris quadricollis (Bates, MS. in B. M. Coll.).

Sipora and Siberut, 5 ex.

Pic's brief description appears to fit this insect, except that the elytra though sometimes purple are in certain lights bright blue, the head and thorax dark blue black.

It differs from *P. latitarsis*, Fairm., apart from its smaller size, in the much less strongly dilated tarsi in the ♂, in which sex also the intermediate tibiæ are bent in the middle, the inner side beyond the bend being densely pubescent.

Bates's specimens are from Java, Singapore and S. Borneo.

17. Platycrepis hemiceroides sp. n.

Elongate ovate, metallic bluish green, the sutural interval, the 5th and part of 6th interval and the lateral margin of the same colour, the rest of the elytra coppery.

Head finely and sparsely punctate with a transverse sulcus between the eyes. Thorax impunctate, transversely depressed across the base, with an oblique fovea or sulcus on each side of the middle line, limiting this depression, and a small basal fovea on each side opposite the 4th interval. Elytra strongly convex, the striæ deeply cut, impunctate, intervals somewhat convex, obsoletely punctulate. Intermediate tibiæ of ♂ bent in the middle, densely pubescent on inner side beyond the bend. Tarsi not very strongly dilated. Length 8—10 mm.

Siberut, 1 ex. (C.B.K. and N.S.); Mentawi Ids., 1 ex., No. 188 (H.H.K.).

In colouration somewhat resembles *Hemicera splendens*, but the transition between the bands of colour, though somewhat iridescent, is much less gradual than in that species.

18. Platycrepis lateritius sp. n.

Ovate, very convex, æneopiceous, the elytra with suture bluish, the greater part of the disc æneous, merging gradually laterally through purple and violet to blue along the sides, green and again æneous appearing on the shoulder, and in addition purple towards the apex. Elytral striæ feebly impressed but distinctly punctate; intervals feebly convex and obscurely punctulate. Tarsi very feebly expanded. Length 5—6 mm. Sipora 1 ex., No. 168 (H.H.K.); Malay Peninsula, Gap (Fraser's Hill, Selangor-Pahang boundary), 2 ex. (A. M. Lea and wife in Brit. Mus. Coll.).

Remarkable on account of its small size and almost seriate punctate instead of sharply striate elytra.

19. Simalura sulcimargo sp. n.

Small, metallic. with the colouring almost of *Hemicera splendens*, Wied. Head short, strongly transverse, the clypeus not emarginate, and concealing the base of the labrum; puncturation rather strong, but not very close; antennæ stout, not reaching base of thorax, the last six joints expanded on inner side. Thorax strongly transverse, about twice as wide as in the middle long, anterior margin feebly rounded, base sub-angularly prominent in the middle and finely marginate; sides sinuate, the anterior angles rounded, the posterioı sharp and slightly prominent; immediately within the lateral and anterior margins is a wide, deep and sharply excised groove, briefly interrupted in the middle of the anterior margin; disc not strongly convex. slightly depressed across the base, moderately strongly but not closely punctate. Elytra very convex, in strong contrast with the nearly horizontal thorax, colours in bands much as in H. splendens, except that the purple patch forming the centre for a lateral concentric series instead of being on the 9th interval as in *H. splendens*, occupies the 7th and 8th intervals; striæ rather deep, not very closely punctured; intervals slightly convex, finely and sparsely punctured, the interspaces not alutaceous. Legs black, tarsi villose beneath, the joints not expanded, last joint about as long as the rest together. Length 5 mm. Siberut, 1 ex. (C.B.K. and N.S.).

Resembles a small *Hemicera*, but differs from that genus in the structure of the head

20. Eucyrtus pretiosus Lac. Siberut (C.B.K. and N.S.).

A single very small example only 11 mm. in length.

A species of wide distribution occurring from Borneo to Tonkin.

21. Gauromaia variicolor Pic., Mélanges exot.-ent. fasc. 35, 1922, p. 24.

Pulau Tello, Batu Islands, XI, 1924 (H.H.K.).

The single specimen agrees well with examples in the British Museum that I take to be this species from Java and Singapore.

22. (?) **Gauromaia rufiventris**, Gebien, Notes Leyden Mus. XXXVI, 1914, p. 67.

A variable series from Sipora and Siberut appears to agree fairly well with the description, except that the elytra, in some examples purplish with green suture and sides, in others are almost concolorous with the thorax, at most a little more æneous in the shoulders and at apex. In form and sculpture they are extremely similar to the last species, in fact both are probably but colour forms of one.

23. Pseudonautes (Thydemus) helopinus, Fairm. Sipora and Siberut Ids.

The present series differs from examples in the British Museum from Singapore in their rather larger size, and more brilliant play of colours, but does not appear to be specifically distinct. The description of *P. sinuatipes*, Pic, would also appear to fit them, but unfortunately in the only example (possibly ♀) with intermediate or posterior tibiæ present these structures are straight.

24. Pseudonautes angustivittatus, sp. n.

Small, polychrome; head bluish green, with a transverse purplish line behind the eyes. Thorax bluish green towards the sides, the middle area dark æneous, separated from the lateral areas by narrow bands of blue and violet. Elytra longitudinally banded with various colours, the bands very largely limited by the striæ in the following sequence:--sutural interval blue, 2nd greenish æneous, 4th coppery, 5th blue, 6th again coppery, 7th æneous, 8th and 9th greenish. Striæ deep, moderately closely punctured, intervals strongly convex, almost impunctate. Underside dark piceous; sides of abdominal segments more or less metallic; femora rather strongly metallic. Length 7 mm.

Siberut, 1 ex. (C.B.K. and N.S.).

Allied to *Ps. sulcipennis*, Geb., but with sides of thorax rather arcuately narrowed in front, not sinuate, the anterior angles less prominent, and the colouration very different.

25. Phædis siporana, sp n.

Oblong, head and thorax black, with strong green and gold metallic tints, the latter with a sub-median pair of narrow irideous bands, not quite straight and diverging slightly from anterior margin to base. Elytra more brightly coppery æneous, shading through coppery and purple to blue at the humerus, and, further, through green to æneous at the apex; the sutural interval is also blue along its median third, while the third, fifth and seventh intervals have each a smaller patch of green or blue about the middle of their length. Underside, legs and antennæ black. Length 8 mm.

Sipora, 1 ex. (C.B.K. and N.S.).

Resembles *P.* (*Pseudeumolpus*) *rotundicollis*, Fairm., but the head and thorax are less strongly metallic, the colours appearing to be, as it were, washed on a black ground, the elytra are also differently sculptured, being striate-punctate, the punctures rather uneven in size, not very closely placed, and not connected by any definite incised line; the intervals are slightly convex, and finely rather indistinctly punctulate.

26. Obriomaia subcostata, Fairm. (**Eucyrtus**). Siberut, 1 ex. (H.H.K.).

A small individual only 5 mm. in length.

27. Cnemandrosus chalceus, Gebien.

Siberut, 1 ex. (H.H.K.).

On comparison of the type of the Indian *Plamius tenuistriatus*, Fairm., with a cotype of *Cnemandrosus phaseoli*, Geb., it appears to me very doubtful whether these genera are distinct. In *Plamius*, the 6th joint of the antennæ is not wider than the 5th, whereas in *Cnemandrosus* it is triangular forming the first joint of the club.

28. Amarygmus æneus, Wied. Sipora and Siberut Ids.

29. Amarygmus micans, F. Siberut, 1 ex. (H.H.K.).

30. Amarygmus semiæneus, sp. n.

Ovate, convex, reddish piceous with the elytra fusco-æneous. Head sub-opaque, finely and remotely punctured; eyes separated by a distance about equal to the width of one of them; antennæ moderately stout, 3rd joint almost as long as 4th and 5th together, 6th to 11th wider, sub-equal, about half as long again as wide. Thorax transverse, its apical width little more than half the basal width, the sides and apex finely margined; anterior angles rather less than right angles, posterior angles obtuse; disc smooth, very finely, sparsely, almost obsoletely punctured. Elytra widest a little before middle, punctate-striate, the striæ sharply cut, their punctures elongate, becoming much finer posteriorly; intervals feebly convex near suture and towards apex, but strongly convex laterally, especially about the middle. Underside and legs smooth, scarcely punctate, middle tibiæ in male slightly bent in middle, clothed on inner side beyond the bend with long pubescence. Long 6 mm.; lat. 4·5 mm.

Sipora and Siberut (C.B.K., N.S. and H.H.K.).

Resembles a small broad *A. æneus*, Wied., but very distinct in the wide distance separating the eyes, in the shape of the thorax, and in the non-metallic colour of the body.

31. Amarygmus klossi, sp. n.

Ovate, strongly convex, head black, æneous between the eyes; thorax dark purplish blue changing towards the sides through green to æneous; elytra polychrome, greenish blue along the suture, ranging through æneous and coppery to purple on the 5th and 6th intervals, then back to green along lateral margin; underside, legs and antennæ black.

Head rather finely, not closely punctate, distance between the eyes about equal to the length of the third antennal joint, ocular furrows wanting; antennæ slender, about half as long as body. Thorax widest at base, the sides evenly arcuate, apical width about half that of base. Elytra widest before the middle, the striæ deep, and moderately strongly punctured; intervals flat, rather strongly but not closely punctured. Length 9 mm.

Sipora, Oct. 1924, 1 ex. (C.B.K. and N.S.).

In shape resembles the common *A. æneus*, Wied., but quite differently coloured, and with differently formed elytral striæ and intervals. From the description it would appear to resemble *A. padangus*, Gebien, but this species is smaller and has the elytral intervals strongly convex behind, the femora probably more strongly clavate, and the first joint of the posterior tarsi longer than the rest together. In *A. klossi* this joint is scarcely longer than the last.

32. Cyriogeton tenuistriatum, sp. n

Ovate, very convex, nitid, fusco-æneous with the front of the head, antennæ, apex of femora and tarsi black, the rest of the femora reddish, with the tibiæ darker.

Head finely and sparsely punctulate, eyes moderately approximate, separated by a space rather less than the length of the 4th antennal joint, with a fine but sharply cut sulcus round their inner edge; space between the eyes behind their nearest approximation impressed; clypeal suture rather deeply incised. Antennæ slender, 7th joint reaching base of thorax. Thorax very convex, especially towards sides, strongly narrowed from middle to apex, sides rounded, evenly bordered, but the margin somewhat concealed from above by the convexity of the dorsum; anterior angles obtuse, except for a small projection formed by the border. Elytra suddenly contracted at base, widest about the middle, finely seriate-punctate, scarcely striate, the punctures evanescent near base and apex, intervals flat, impunctate; lateral carina completely visible from above. Underside of prothorax and mososternum reddish piceous; prosternum obtusely carinate before coxæ, but concave between them, impunctate, depressed behind coxæ with apical prominence; mesosternum medially excavate in front with vertical walls for reception of prosternal process; metasternum strongly æneous; abdomen reddish piceous with fainter æneous reflections, the segments longitudinally rugulose but scarcely punctate, anal segment smooth with marginal sulcus. Legs smooth, anterior femora toothed beyond middle beneath, tibiæ rounded externally, finely and sparsely punctulate, with no obvious sexual modifications in the specimens before me. Long. 16 x lat. 8 mm.

Sipora, 1 ex. (C.B.K. and N.S.); Borneo, Sarawak, 2 ex. (A. R. Wallace).

Allied to *C. insignis*, Pasc., but smaller and more convex, the punctures of the elytral series less closely and more irregularly spaced. Probably also closely allied to *C. borneensis*, Pic, which is unknown to me.

The individual from the Mentawi Islands differs from the Bornean examples, which are taken as typical, in the darker, almost black colour of the underside and legs.

33. Strongylium gratum, Mäkl. Siberut.

34. Strongylium pallidonotatum, Pic, Mélanges exot.-ent. fasc. 23, 1917, p. 19

I have little doubt about the identity of this insect, examples from Java agreeing tolerably well with the somewhat inadequate description. The coloration varies considerably, the head and thorax being sometimes entirely testaceous, or the latter with the lateral borders and a median stripe darker, the elytra testaceous, with a basal triangular patch of paler yellow, and behind this two lateral patches fuscous with greenish reflections. The single example from Siberut, (H.H.K.) differs in having the elytra except for two pale basal patches, black with scarcely a trace of green. The elytra sculpture is very peculiar; on a triangular area bounded by the humeral callosity, the middle point of the side margin, and the highest point on the suture (*i.e.* the dark area in the pale form noted above) the punctures of the striæ are very large, deep, and somewhat lenticular, the intervals, the first two excepted, rising gradually from the inner limiting stria and falling away abruptly to the outer, almost as in *Obriomaia sub-costata*, Fairm. (*supra*); the large fœveiform punctures encroach very slightly on to the steep side of the interval, but extend nearly half way across the gently sloping side; apart from this area the punctures are smaller and more normal, the striæ sharply impressed to the apex. The apex of the elytra is sharply mucronate.

This species is closely allied to *S. gravidum*, Makl., which has similar sculpture, but in the latter the thorax is narrower and more convex.

35. Strongylium subdepressum, Gebien (? M.S.) Siberut, 1 ex. (C.B.K. and N.S.).

Though specimens from Sandakan, Borneo, were received from the late Prof. C. F. Baker with this name, I cannot find that a description has ever been published. The Mentawi example differs from the Bornean specimens in being bright blue above instead of testaceo-æneous, with the elytral interstices uniformly narrow; in the Sandakan example the third and fifth interstices are more raised and costiform. Further examples from Borneo and Penang show intermediate stages both in colour and in the development of the costæ.

36. Strongylium promiscuum, Geb. Supplem. Ent. 15, 1927, p. 56. Sipora and Siberut.

The description agrees very closely with the specimens before me, except that the triangular expansion of the anterior thoracic border occupies only 1/10 to 1/8 instead of 1/5 of its median length. As, however, the type is unique this might be an exceptional occurrence.

Spolia Mentawiensia

Phytophaga

by G. E. BRYANT

[A bare list of names of *Phytophaga* obtained by myself, Mr. N. Smedley of the Raffles Museum and Dr. H. H. Karny of the Buitenzorg Museum from the Mentawi Islands off the west coast of Sumatra in 1924[1] has been provided by the Imperial Bureau of Entomology. Nine species have been determined generically only and these, or some of them, may later prove to be undescribed. The localities have been taken from the material returned to us, but several of the species may have been secured in other places visited as it is probable that duplicates have been retained by the determinator.

In addition to the material listed here certain other specimens were obtained which were submitted to Monsieur V. Laboissière who has reported on them in another paper —*C. Boden Kloss.*]

Crioceridæ

Crioceris impressa, F. Siberut.
Crioceris terminata, Baly, Siberut.
Lema femorata, F. "Mentawei".
Lema quadripunctata, Oliv. Siberut.

Eumclpidæ

Goniopleura viridipennis, Clk. Sipora.
Aulexis sp. Sipora.
Corynodes discoidalis, Jac. Siberut.
Corynodes discoidalis, Jac. Siberut.
Abirus sp. Sipora.
Colaspoides apicicornis, Jac. Sipora; Padang, West Sumatra.
Colaspoides nigripes, Jac. Siberut; Sipora; and Pulau Tello, Batu Islands.
Colaspoides laportei, Baly. Siberut.
Nodostoma sp. Siberut.
Phytorus pinguis, Baly. Siberut, Sipora.
Cleorina fulvitarsis, Lef. North Pagi Id.

Halticidæ

Haltica cyanea, Weber. Padang, West Sumatra.
Sebæthe affinis, Jac. Padang, West Sumatra.

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[1] *Vide* Bull. Raffles Mus., No. 1, Sept 1928, pp. 2—4

Sphæroderma rafflesi, Jac. Siberut.
Sphæroderma laevipennis, Jac. Padang, West Sumatra.
Nisotra chrysomeloides, Jac. Padang, West Sumatra.
Crepidodera sp. Siberut.
Norarthra sumatrensis, Har. Siberut.
Homelea sp. Siberut.

Galerucidæ

Ceratia flavomarginata, Duv. Siberut.
Ceratia frontalis, Baly, Siberut; Padang, W. Sumatra.
Ceratia tenuicincta, Jac. Siberut.
Ceratia atripennis, F. Siberut and Sipora.
Ceratia analis, Weber. Siberut.
Ceratia postica, Chap. Sipora.
Rhaphidopalpa similis, Oliv. Siberut.
Platyxantha quadratricollis, Jac. Sipora.
Aenidea sumatrensis, Jac. Sipora.
Oides pectoralis, Clk. Padang, West Sumatra.
Solenia robusta, Jac. Sipora.
Orthoxia boisduvalii, Clk. Siberut and Sipora.
Pseudosastra sulcicollis, Jac. Sipora.
Sastra sp. Siberut.
Macrima subcostata, Jac. Siberut.
Theopea longicollis, Jac. Siberut and North Pagi Island.
Caritheca quadripustulata, Baly. Pulau Tello, Batu Islands.
Haplosonyx parvulus, Jac. Sipora and North Pagi Island.
Haplosonyx ornatipennis, Jac. Siberut and Sipora.
Haplosonyx collaris, Duv. Siberut, Sipora and North Pagi Id.
Haplosonyx sp. North Pagi Island.
Miltina dilatata, Chap. Padang, West Sumatra.
Haplosonyx sp. Siberut and Sipora.
Dercetis seminigra, Jac. Siberut.
Dercetis latefasciata, Jac. Padang, West Sumatra.
Dercetis sp. Sipora.
Sermyloides bicolor, Jac. Siberut.
Monolepta basimarginata, Bois. Sipora; and Pulau Tello, Batu Islands.
Monolepta sp. Siberut, Sipora and North Pagi Island.
Mimastra platteeuwi, Duviv. Siberut.
Haplosomoides serena, Boh. Padang, West Sumatra.

Spolia Mentawiensia

Phytophaga

Galerucini nouveaux ou peu connus

par V. LABOISSIERE.

correspondant du Muséum National d'Histoire Naturelle de Paris.

(avec une figure)

[The species of Galerucidæ dealt with here are among the more interesting of those obtained by myself, Mr. N. Smedley and Dr. H. H. Karny during our visit to the Mentawi Islands near the west coast of Sumatra in 1924[1]. The rest of the Phytophaga collected have been listed by Mr. C. E. Bryant in another paper. C. Boden Kloss.]

Gen. **Galerosastra** nov.

Forme allongée, subparallèle; dessus du corps recouvert d'une fine pubescence couchée, antennes filiformes, pronotum transversale, cavités cotyloïdes antérieures ouvertes, épipleures des élytres étroits, effasés sous l'épaule et disparaissant vers l'angle latéral. tibias canaliculés en dessus, mutiques au sommet, ongles profondément bifides.

Geno-Type: *G. sumatrana* Jac. (*Galerucella*).

Les insectes de ce genre ont le faciès des *Sastra* mais ils s'en séparent nettement par la forme du pronotum et des antennes, le premier est transversal environ deux fois plus large que long, les bords latéraux, s'élargissent plus ou moins en avant du mileu mais ne sont pas anguleux, ils convergent plus fortement en avant; les angles antérieurs sont petits et droits, les postérieurs obtus, la surface est creusée de chaque côté d'une profonde impression et le milieu est marqué d'un sillon peu profond s'elargissant á ses deux extrémités.

La tête est aussi large que le pronotum, les antennes atteignent la moitié des élytres, le troisiéme article est de moitié plus long que le deuxième et plus court que le quatrième chez la ♀; le quatrième article est aussi long que les deux précédents réunis, chez le ♂. Dans le genre *Sastra* le pronotum est anguleux latéralement et le troisième article des antennes beaucoup plus long que le quatrième. L'écusson est en triangle à côtés curvilignes et obtus au sommet. Les élytres s'élargissant faiblement en arrière, leur surface est couverts d'une ponctuation fine et serrée tres fine, le bord latéral est coupant, faiblement explanée à partir du dessous des épaules et sur toute la longueur des épipleures; ceux-ci sont étroits, effacés sous l'épaule et disparaissent vers l'angle latéral.

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[1] Vide Bull. Raffles Mus., No. 1, 1928, pp. 2—4.

Les pattes sont normales, les tibias creusés en dessus d'un sillon large mais peu profond, au fond duquel s'étend une carène lisse, leur sommet est mutique; le premier article des tarses postérieurs est assui long que les deux suivants réunis, les ongles profondément bifides. Chez le ♂ , le sommet de 'labdomen est triangulairement échancré.

La forme des épipleures et la présence d'un sillon sur le dessus des tibias séparent *Galerosastra* de *Galerucella*.

Galerosastra[1] **sumatrana** Jac., 1896, Ann. Mus. Genova, XXXVI, p. 467.

Siberut Island (Sept. 1924); Sipora Island (Oct. 1924) C.B.K. and N.S.; deux exemplaires.

Agelastica cyanicollis Jac., 1884, Notes Leyden Mus., VI, p. 217 (*Malacosoma*).

Cet insecte est mieux à sa place dans le genre *Agelastica* que parmi les *Exosoma* où M. Jacoby l'a place. Les deuxième et troisième articles des antennes sont égaux et le prosternum est complètement effacé entre les hanches.

Chez les individus examinés, le premier article des antennes est bleu sombre brillant, le second plus ou moins brun, parfois entièrement sombre, le pronotum est couvert d'une très fine ponctuation—visible à un grossissement de 25-30—Les tarses sont bruns.

♂ , sommet de l'abdomen incisé de chaque côté, trilobé, le lobe médian concave.

North Pagi Island (X; 1924, C.B.K. and N.S.).

Arcastes dimidiata n. sp.

Fauve rougeâtre brillant, antennes—sauf les deux articles de la base et les deux apicaux, fauves—moitié apicale des élytres, tibias et tarses, noirs: ongles roux, abdomen testacé pale avec le dernier segment noir.

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[1] *G. multimaculata* Jac., loc. cit., 1886, XXIV, p. 106 (*Galerucella*), prend egalement place dans ce genre.

Dans sa description l'auteur signale l'absence des trois derniers articles des antennes, j'ai pu examiner ces organes, sur deux individus que Fr. Verbeck m'a communiqués, les trois derniers articles sont blanchâtres comme chez *G. sumatrana*.

Sumatra: Mont Korinchi alt. 1500 et 2220 m.

Tête petite, lisse, épistôme plan ne présentant pas de carêne, calus surantennairse étroits, transversaux peu saillants, ils sont limités en dessus par un faible sillon, antennes légèrement fusiformes, dépassant la moitié des élytres, les deux premiers articles sont fauve brillant et les deux derniers de la même couleur, mais mats et un peu plus sombres, les articles intermédiaires sont noirs, pubescents; le deuxième article est petit ovalaire, le second plus large et deux fois plus long, le quatrième aussi grand que les deux précédents réunis et un peu plus épais que le troisième, les suivants sont un peu plus courts et s'élargissent faiblement jusqu'au septième pour s'amincir ensuite vers le sommet.

Pronotum transversal, deux fois et demie plus large que long, bords latéraux très arrondis et nettement rebordés, bord antérieur et base immarginés, le premier presque droit, la seconde fortement arquée, angles antérieurs arrondis, épaissis, les postrérieurs obtus, surface lisse; marquée de deux faibles impressions transversales très rapprochées, situées une de chaque côté, sur le milieu. Ecusson triangulaire lisse.

Elytres ovalaires s'élargissant assez fortement à partir de la base, largement et séparément arrondis au sommet, ils sont rebordés jusqu'à l'apex; surface convexe, paraissant lisse, la ponctuation qui la recouvre étant très fine et visible seulement à un grossissement de 25—30; plus apparente cependant sur la partie noire qui occupe un peu plus de la moitié postérieure.

Les pattes sont normales, tous les tibias mucronés, ceux des pattes postérieures arqués; le métatarse postérieur aussi long que pattes postérieures arqués; le métatarse postérieur aussi long que les trois articles suivants réunis. Long: 4·7 mm., larg. 3 mm.

♂, sommet de l'abdomen incisé de chaque côté, trilobé, le lobe médian plan, dépassant légèrement les latéraux, sinué au sommet.

Siberut Island (Sept. 1924, C.B.K. and N.S.); un ♂.

Taphina dimidiata Duv., 1885 C. r. Soc. ent. Belg. XXIX, p. 52.

♂, premier article des tarses des deux paires antérieures triangulaire, fortement dilaté; sommet du dernier segment abdominal largement mais peu profondément sinué de chaque côté, le milieu formant un lobe arqué très court.

Siberut Island (Sept. 1924, C.B.K. and N.S.); un ♂.

Aplosonyx albicornis Wied., var. **insularis** var. nov.

Dans la forme typique les deux ou trois premiers articles des antennes et parfois une partie du quatrième sont noirs, les autres sont blancs; dans la variété *insularis* les deux articles du sommet seuls, sont blancs; l'abdomen par contre est plus clair, le plus souvent entièrement jaune ou, le premier segment seul rembruni; tandis que chez *albicornis* le premitr segment est noir et les suivants presque toujours, au moins en partie, noirs ou rembrunis.

Enfin la ponctuation chez la variété *insularis* est plus forte et plus profondt.

Chez un individu immature, la tête, le pronotum, la poitrine et les pattes sont brun roux.

Siberut Island (Sept. 1924, C.B.K. and N.S.); sept examplaires.

Xenoda carinata sp. n.

Jaune d'ocre ou fauve; les antennes sont jaunes chez le male avec les articles 3—8 légèrement rembrunis et les trois derniers un peu plus pâles que les deux premiers; chez la femelle, les deux articles de la base sont testacés, rembrunis en dessus, les suivants noirs, et les deux apicaux blanchâtres; écusson brun; élytres bleu violet plus ou moins pourpres ou verdâtres, poitrine et abdomen noir brillant, pattes testacées, bords supérieur des tibias et tarses brun noir.

♂, antennes difformes, deuxieme article très petit, les cinq suivants en forme de cylindres s'enboîtant l'un dans l'autre et formant ensemble un gros fuseau tronqué au sommet; le huitième est complètement inséré dans le précédent et se continue en forme de longue épine s'étendant parallèlement au neuvième article, qui est aussi long que les articles 3—7 réunis, il est assez grèle à la base et s'elargit vers l'extrèmité, le dixième est plus court, assez large la base, il présente à son sommet un avancement tronqué, le dernier est aussi long mais plus grèle; sur la partie tronquée de l'avancement du dixième article on observe, en dehors de quelques poils; la présence de trois mucrons pourvus à leur sommet d'une membrane foliacée ovalaire. (fig. 1).

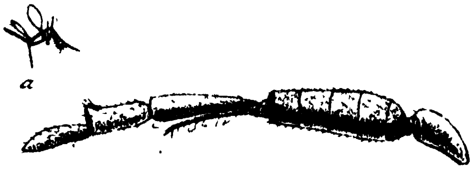

Fig. 1—Antenne de *Xenoda carinata*
a—sommet du 10^{r} article.

♀, antennes filiformes, pubescentes; les articles 3 à 7 sont égaux entre eux, les suivants légèrement plus allongés.

Tête aussi large que le pronotum; clypeus triangulaire, large, peu convexe, remontant en pointe entre les antennes chez la ♀, chez le ♂, les calus surantennaires descendent plus bas sur le front et forment ensemble une légère saillie, ils sont séparés par un faible sillon continué jusqu'au sommet du vertex.

Le pronotum est court, fortement transversal, d'environ deux fois et demie plus large que long, les bords latéraux sont droits et parallèles, le bord antérieur échancré, la base arquée, les angles antérieures aigus, surface faiblement convexe et creusée d'une large impression transversale commençant avant la moitié et atteignant la base. Ecusson triangulaire, lisse.

Elytres allongés subparallèles, à peine élargis en arrière séparement et obtusément arrondis à leur extrémité; leur surface est garnie de poils sombres peu serrés, presque couchés, elle est en outre couverte d'élévations ruguleuses transversales; une fine carène commence en arrière de l'épaule et s'étend longitudinalement sur le côté au-delà du milieu. Long. 5·25—5·75 mm.; larg. 2—2·25 mm.

X. carinata est voisin de *X. spinicornis* Baly et *X. weyersi* Duv., il s'en éloigne par la carène latérale des élytres, en outre chez le premier la tête et le pronotum sont brun de poix; le second est complètement jaune en dessous, et la femelle a les trois derniers articles des antennes blancs et le septième plus long que les autres.

Sipora Island (C.B.K. and N.S., Oct. 1924): un ♂; Siberut Island (C.B.K. and N.S. Sept. 1924): une ♀.

Platyxantha fulvovirens n. sp.

Jaune fauve assez brillant, les antennes un peu plus pâles à partir du troisième article et le sommet du dernier article rembruni, écusson parfois noirâtre au sommet; élytres noir verdatre, plus sombres après le milieu jusqu'au sommet, la base plus nettement vert bronzé ou vert bleu.

♀, tête moins large que le pronotum, carène faciale nette, s'avançant en pointe entre les antennes et separant les extrémités des calus surantennaires, ceux-ci transversaux, limités en dessus par un sillon droit avec une impression dans son milieu; vertex lisse; antennes filiformes, pubescentes à partir du troisième article le second article est petit, subglobuleux, le troisième aussi long que les deux premiers réunis et un peu plus grand que chacun des suivants qui sont égaux entre-eux.

Pronotum à peine d'un quart plus large que long, bords latéraux droits et faiblement divergents sur la moitié basale, dilatés arrondis sur la moitié antérieure et très fortement convergents vers le sommet ou ils se redressent parfois très légèrement les angles antérieurs sont obtus émoussés, généralement peu marqués et très fortement surbaisseés, les postérieurs sont obtus le bord antérieur est immarginé et échancré, la base arrondie, la surface convexe, paraît lisse avec quelques points très fins épars, principalement autour des impressions qui sont creusées au-dessous du milieu, une de chaque côté, vers le tiers latéral, elles sont peu profondes, ovalaires et légèrement obliques, l'intervalle qui les sépare est un peu déprimé. Ecusson triangulaire lisse.

Elytres parallèles sur le premier tiers, s'élargissant faiblement en arrière, ils sont obtusément et séparément arrondis au sommet, la surface est recouverte d'un pointillé très fin et serré, avec en outre une ponctuation très fine, peu dense, à peine visible en arrière et sur la base, plus forte et formant des lignes presque régulières, courtes, dans les dépressions; la première depression, infrahumérale, oblique légèrement à son début puis s'etend ensuite verticalement en arrière jusque vers le premier tiers ou elle se réunit à une seconde rejoignant obliquement la suture; cette dernière est également impressionnée à partir de cet endroit jusqu'à l'écusson; la partie basale ainsi entourée présente une élévation arrondie très nette qui est en outre d'une couleur plus vive, généralement vert bronzé. Long. 7·5 mm. larg. 4—4·25 mm.

Bien que ne connaissant pas le mâle de cette espèce, je crois pouvoir la classer dans le genre *Platyxantha*, le troisième article des antennes plus long que les autres, le pronotum à peine plus large que long, caractérisant assez bien les femelles du genre. *P. fulvovirens* prend place à coté de *P. nigripennis* Jac., qui est noir en dessous, avec le milieu du pronotum generalement rembruni et les élytres franchement noirs. Sa couleur pourrait permettre la confusion avec certaines varietés femelles de *Thaumacera fulvicollis* Jac., mais chez ces dernières le troisième article des antennes est à peine aussi long que le quatrième et le pronotum plus fortement transversal.

Sipora Island (C.B.K. and N.S., Oct. 1924); type: deux ♀. North Pagi et Siberut Island (Sept., Oct. 1924); deux ♀.

Spolia Mentawiensia

Rutelinæ

by FRED. OHAUS, *Mainz.*

[Dr. Ohaus has supplied information about the few *Rutelinæ* secured by myself, Mr. N. Smedley and Dr. H. H. Karny during our visit in 1924 to the Mentawi Islands off the west coast of Sumatra.[1] These beetles appear to be not common on the group for only the same number of species was secured on it during a stay of two months as was obtained in two or three days at Padang in West Sumatra.—*C. Boden Kloss.*]

Anomala inguinalis Ohs.

Siberut Id.

The species was described from specimens collected at Matang in Java. Distribution: Nias Island, Sumatra; Tebing-tinggi, Palembang, Manna, Fort de Kock and Tambangsawah.

Anomala chalcescens Sharp.

Padang, West Sumatra.

In Sumatra common everywhere. In the Malay Peninsula recorded from Perak and the mountains of Pahang. Singapore Id.

Anomala decorata Kirsch.

Siberut Id.

Euchlora chalcites Sharp.

Siberut Id. and Sipora Id.

Common everywhere in Sumatra · also recorded from Nias Id.

Euchlora nigrescens Ohs. var. **foliacea** Ohs.

Padang, West Sumatra.

The species very variable in colour, was described from specimens obtained on Simalur Id., W. Sumatra, by E. Jacobson: also secured by the same collector near Fort de Kock, 3,000 ft., West Sumatra.

Euchlora concinna Burm.

Padang, West Sumatra.

First described from Padang and later taken on Simalur Id. by E. Jacobson.

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[1] *Vide* Bull. Raffles Mus., No. 1, Sept. 1928, pp. 2—4.

Euchlora kannegeiteri Ohs.

Siberut Id. and Sipora Id.

Described from Pulau Pini in the Batu Ids., north of Siberut.

Chætadosetus borneensis Kraatz.

Padang, West Sumatra.

Spolia Mentawiensia

Gryllidæ

by L. CHOPARD

(*with twenty-four figures*)

The *Gryllidæ* fauna of the Mentawi Islands does not present very peculiar characters; it borrows its elements from the neighbouring faunæ of Java and Sumatra. This fauna is particularly rich in *Trigonidiinæ* and *Eneopterinæ*; the *Nemobiinæ* and the and the true *Gryllinæ*, on the contrary, are less numerous than in the Indian fauna. Among the rather characteristic genera the following are to be mentioned: *Parendacustes*, *Nisitra*, *Cardiodactylus*, *Heterotrypus*, *Itara*, *Pteroplistus*, *Lebinthus*; most of these are purely Malaysian genera, but some of them are also represented in the oceanic region and towards the Philippine islands.

During their visit in 1924 to this group of islands off the west coast of Sumatra[1] Messrs. C. Boden Kloss, N. Smedley and H. H. Karny secured a certain number of new species; but very few of them, if any, should yet be considered as truly endemic species; they will very likely be found again in the neighbouring large islands.

As a whole the Gryllid fauna of the Mentawi Islands is the typical Malaysian fauna, the affinities of which are divided between India and the oceanic fauna but more decided towards the latter than towards the former.[2]

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[1] *Vide* Bull. Raffles Mus., No. 1, Sept. 1928, pp. 2—4.

[2] For a discussion of the faunal relations of the Mentawi Islands as shown by their mammals *vide* Kloss, P. Z. S. 1928, pp. 797—808.

EXPLANATION OF THE FIGURES

Fig. 1. *Cophogryllus bodenklossi*, n. sp., female.

Fig. 2. *Pentacentrus annulicornis*, n. sp., supraanal valve of male.

Fig. 3. *Id.*, genitalia.

Fig. 4. *Liphoplus minusculus*, n. sp., maxillary palpus.

Fig. 5. *Liphoplus fuscipennis*, n. sp., apex of ovipositor.

Fig. 6. *Arachnocephalus breviceps*, n. sp., head.

Fig. 7. *Pteroplistus platyxiphus* Haan, right elytron of male.

Fig. 8. *Id.*, genitalia.

Fig. 9. *Ornebius karnyi*, n. sp., male.

Fig. 10. *Lebinthus truncatipennis*, n. sp., female.

Fig. 11. *Lebinthus truncatipennis*, n. sp., elytra of male

Fig. 12. *Id.*, genitalia.

Fig. 13. *Heterotrypus buqueti* Sauss., genitalia.

Fig. 14. *Heterotrypus kannyi*, n. sp., genitalia.

Fig. 15. *Itara microcephala* Haan, lateral view of genitalia.

Fig. 16. *Madasumma karnyi*, n. sp., apex of ovipositor.

Fig. 17. *Madasumma grandipennis*, n. sp., genitalia.

Fig. 18. *Id.*, right elytron of male.

Fig. 19. *Id.*, apex of ovipositor.

Fig. 20. *Madasumma karnyi*, n. sp., lateral view of genitalia.

Fig. 21. *Id.*, right elytron of male.

Fig. 22. *Podoscirtus lineiceps*, n. sp., apex of ovipositor.

Fig. 23. *Podoscirtus lineiceps*, n. sp., female.

Fig. 24. *Aphonomorphus pallipes*, n. sp., male.

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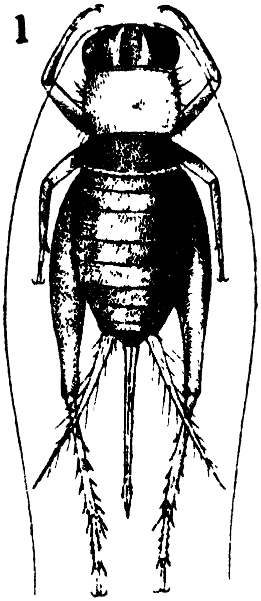

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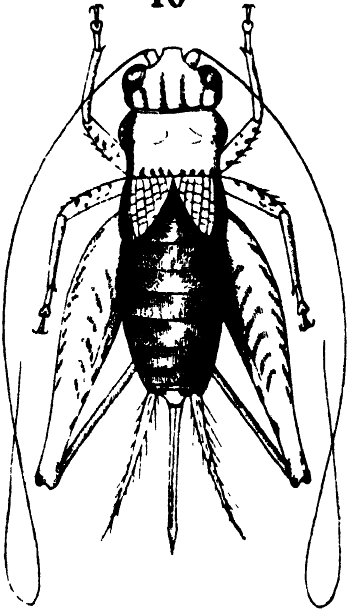

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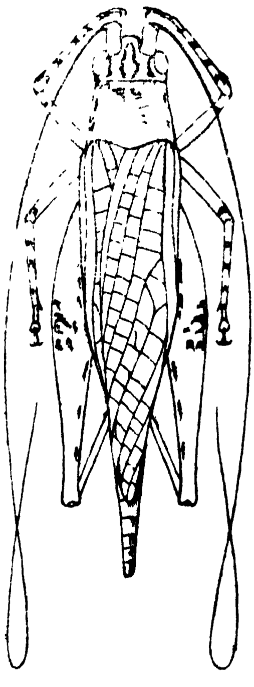

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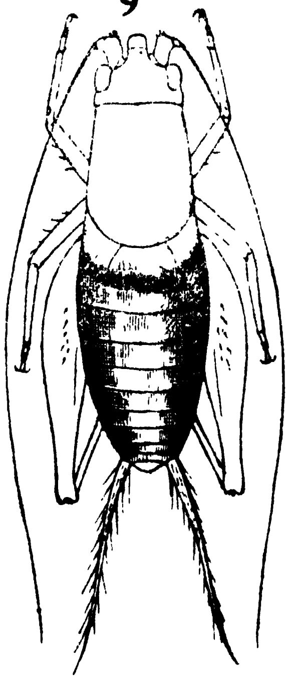

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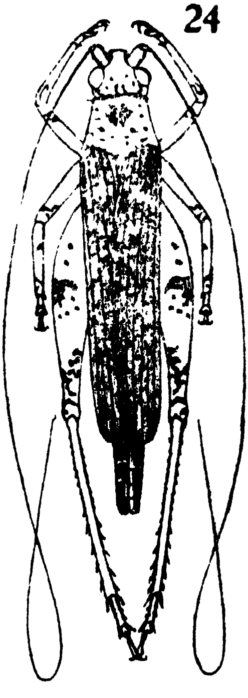

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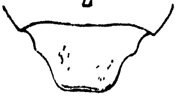

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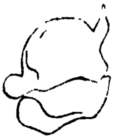

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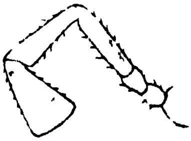

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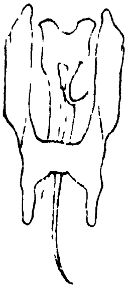

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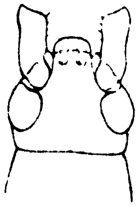

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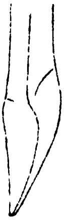

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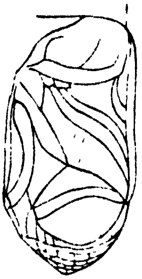

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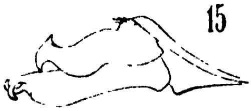

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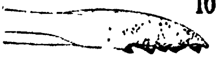

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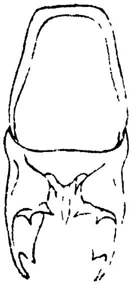

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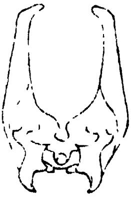

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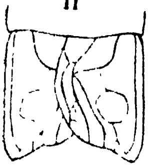

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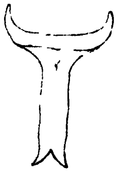

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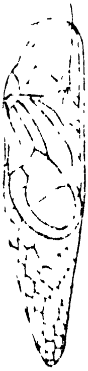

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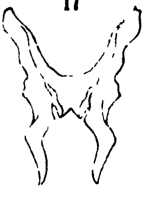

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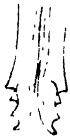

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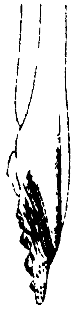

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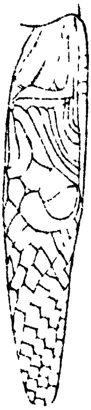

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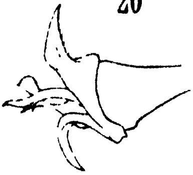

Fam. **Gryllidæ**

Sub-fam. GRYLLOTALPINÆ

Gen. **Gryllotalpa** Latr.

1. Gryllotalpa africana Beauw.
Sipora, 2 ♂ (H. H. K.).

2. Gryllotalpa fusca Chop.
Siberut, 1 ♂, 1 ♀ (C.B.K. and N.S., 1 ♂ (H.H.K.).
A species recently described from Sarawak.

3. Gryllotalpa hirsuta Burm.
Sipora, 1 ♂ (C.B.K. and N.S.).
This big species is known from Java and Borneo.

Sub-fam. NEMOBIINÆ

Gen **Pteronemobius.**

4. Pteronemobius taprobanensis infernalis Sauss.
Siberut, 3 ♂, 5 ♀ (H.H.K.).
A species widely distributed in the Malaysian sub-region.

5. Pteronemobius vagus Walk.
Siberut, 2 ♀ and Sipora, 1 ♀ (H.H.K.).
This is the first record of this Indian species in the Malay Archipelago.

Sub-fam. GRYLLINÆ

Gen. **Brachytrypes.**

6. Brachytrypes portentosus Licht.
Padang, West Sumatra, 1 ♀ (H.H.K.).

Gen. **Gryllus** L.

7. Gryllus mitratus Burm.
One young ♂, 2 ♂, 2 ♀ (C.B.K., N.S. and H.H.K.).

8. Gryllus aspersus Walk.
Gryllodes berthellus Saussure.

Siberut, 2 ♀ ; Padang, W. Sumatra, 4 ♀ (H.H.K.).

All these specimens belong to the micropterous form, which had been described by Saussure as *Gryllodes berthellus*; the macropterous individuals present an internal drum on the anterior femora as the true *Gryllus*.

9. Gryllus confirmatus Walk.

Siberut, 1 ♀ (C.B.K. and N.S.).

Genus **Cophogryllus** Sauss.

10. Cophogryllus bodenklossi n. sp. (1).

Types: 1 ♂, 1 ♀, Siberut, September 1924 (C.B.K. and N.S.); small, rufous brown, looking very much like an apterous female of *Nemobius* (fig. 1). Head as wide as pronotum, wide, almost black, shining; forehead a little sloping, with two feebly visible rufous bands; frontal rostrum very short, rounded. Face short, rufous. Maxillary palpi with 4th joint a little shorter than the 3rd, which is slightly compressed, 5th large, triangular, blackish brown, darker than the other joints. Antennæ brown. Eyes rounded, big, but feebly projecting; ocelli very small, disposed in a triangle.

Pronotum transverse with anterior and posterior margins straight, furnished with long bristles; sides rather strongly convex; disk uniformly rufous; lateral lobes concolorous, strongly ascending backwards. Metanotum rufous with posterior margin narrowly yellowish.

Abdomen rufous, pubescent, feebly dilated in the middle. Ovipositor rather long, slender, with apical valves small, acute.

Legs rather short, rufous. Posterior femora somewhat elongate and weakly dilated; tibiæ much shorter than the femora, armed with 4 internal, 5 external spines; superior and median internal spurs equal in length. Metatarsi long, denticulated above.

Length of body 8·2 mm.; pronot. 2 mm.; post. fem. 6·3 mm; ovipositor 5 mm.

This very small species has exactly the facies of the *Nemobiinæ* of the genus *Scottia*; it is very close to *C. ornatus* Chop. but this one is more brightly colored and has 3 spines only on each margin of the posterior tibiæ.

Gen. **Loxoblemmus**

11. Loxoblemmus intermedius n. sp.

Types: 1 ♂, Sipora, 26 October, '24; 1 ♀ Siberut, 19 September, '24 (H.H.K.).

Size and general aspect of *L. equestris* Sauss. and *L. jacobsoni* Chop., the female being quite impossible to differentiate from those species. Antennæ of male with first joint bearing a process nearly as long as in *L. jacobsoni*; facial shield intermediate in shape between the two above species, forehead simply arcuate as in *L. equestris* but the inferior angles of the shield somewhat projecting although less than in *L. jacobsoni.* Elytra with mirror divided much behind the middle by an angulate vein; four chords of which the fourth is very small.

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(1) When no special mention is made, the type specimens have been returned to the collectors for disposal; paratypic specimens are in my own collection.

The type specimens are both macropterous, but one male from Siberut has elytra extending to the apex of abdomen with short wings and a female, from the same locality, is brachypterous, with elytra extending only to the middle of the abdomen.

Gen. **Duolandrevus** Kirby.

12. Duolandrevus brachypterus (Haan.).

One young larva, Siberut, 1 ♂ Sipora (H.H.K.).

Sub-fam. PHALANGOPSINÆ

Gen. **Parendacustes** Chop.

13. Parendacustes cavicola Chop.

Ngalau Gadang cave, Padang, West Sumatra (H.H.K.); several examples of both sexes.

14. Parendacustes pictus Chop.

3 ♂, 2 ♀, Siberut (H.H.K. .

Sub-fam. PENTACENTRINÆ

Gen. **Pentacentrus** Sauss.

15. Pentacentrus annulicornis n. sp.

Type: 1 ♂, Siberut, 20 September, 1924.

Head pubescent, adorned with 4 brown, longitudinal bands. Palpi brown, the 5th joint of the maxillary ones slightly securiform. Antennæ annulated with whitish and brown. Ocelli small, sub-equal. Pronotum transverse, rather strongly pubescent; anterior margin straight, posterior one sub-angular; disk brownish with lighter median line and piriform impresses; lateral lobes dark brown.

Second abdominal tergite presenting a process directed forwards, slightly truncated at apex; supraanal valve nearly quadrangular, wide, rounded at apex, presenting two large regions covered with spinules (fig. 2). Genitalia rather big, rounded with a sharp apical point (fig. 3).

Anterior and median legs rather short, pubescent. Femora dark brown, with a small yellowish ring near the apex; tibiæ dark brown, the anterior ones with a large internal tympanum. Posterior femora rather long, dark brown, spotted with yellowish at their external face; tibiæ brown, armed with 3 small yellowish spines on each margin; metatarsi very long.

Elytra with dorsal field yellowish, nearly translucent, the transverse veinlets feebly marked with brown, presenting a brown spot towards the middle and another one near the anal vein; this one neatly marked; besides the dorsal field presents 3 parallel veins and a small, incomplete one; lateral field dark brown with 3 veins, one of which on the edge, furcate at base, the other two joining the marginal one at their apex. Wings yellowish, longer than the elytra.

Length of body 7·5 mm.; length with wings 11 mm.

This species looks much like *P. philipinensis*, Chop., but the elytral venation is quite different. It seems also very close to *P. unifenestratus* Caud., from Java.

Sub-fam. MOGOPISTINÆ

Gen. **Liphoplus** Sauss.

16. **Liphoplus minusculus** n. sp.

Types: 1 ♂, 1 ♀, Sipora, October 1924 (H.H.K.).

Paratypes; same locality (H.H.K.), 4 ♂; (C.B.K. and N.S.) 3 ♀.

♂. Small, Covered with brown scales and white. Head a little flattened; frontal rostrum as wide as 1st antennal joint, rounded; face yellowish with two brown bands on the protuberance which is not furrowed. Palpi yellowish with a few brown spots; 4th joint of the maxillary ones a little shorter than the 3rd, 5th very short and wide, triangular (fig. 4). Antennæ yellow, ringed with brown.

Pronotum rather strongly narrowing in front, feebly produced backwards; disk covered with brown scales except along the posterior margin where they become of a pure white; lateral lobes white with one brown spot in front and one behind. Abdomen brownish with 4 darker small spots on each tergite; inferior side yellowish; sub-genital plate rather large, rounded; supra-anal valve much wider than long with a rather short erected yellowish process. Cerci as long as the body.

Legs varied with brown and whitish, the tibiæ rather distinctly annulated. Anterior tibiæ perforated with a rather large round tympanum; anterior and median tarsi short, with 3rd joint shorter than the metatarsus. Posterior and median tarsi short, with 3rd joint shorter than the metatarsus. Posterior femora rather stout, little mottled with white; tibial armature weak, medio-internal spur alone rather long; metatarsi darkened at apex, presenting a few small denticles above; 3rd joint very small.

Elytra extending somewhat beyond the posterior margin of pronotum very dark smoky brown with posterior margin nearly black; speculum large, almost completely visible; lateral lobes smoky.

♀. Head as in the male. Pronotum a little longer than wide, feebly narrowing in front, with anterior margin weakly convex; disk rufous brown, convex, posterior margin straight, covered with greyish scales; lateral lobes very small, whitish. Abdomen rufous brown with 4 spots covered with brown scales on each tergite. Ovipositor very short, straight with apical valves rather large, acute, with straight, smooth margins.

Length of body ♂ 7 mm, ♀ 7·5 mm.; post. fem. 4 mm.; elytra ♂ 2 mm.; ovipositor 3 mm.

Small species very close to *L. obscuripennis* Chop., but with 5th joint of maxillary palpi wider; in the male the posterior margin of the pronotum is white and the ovipositor of the female is shorter.

17. Liphoplus fuscipennis n. sp.

Types: 1 ♂, Sipora, 14th September, 1924; 1 ♀, Pulau Tello, Batu Islands, 11th September, 1924.

♂. Rather large, rufous. Head as wide as pronotum, flattened above; facial protuberance as wide as 1st antennal joint, rufous, shining, feebly furrowed above; face short, rufous, shining, the mouth-parts darker. Palpi blackish; 4th joint of the maxillary ones equalling the 3rd, 5th a little shorter, triangular. Antennæ yellowish.

Pronotum slightly narrowing in front, with posterior margin strongly convex; disk covered with yellowish brown scales, very thick along the posterior margin. Three first abdominal tergites covered with yellowish scales, the following ones with grey scales; inferior side of the abdomen silver grey; supraanal valve small, triangular; sub-genital plate small, black, shining; process of the inferior anal valves long, vertically erected, cylindrical, somewhat swollen at base. Cerci very long, yellowish.

Legs rather long, yellowish, covered with scales and presenting a few erected bristles. Anterior tibiæ perforated with a small internal round tympanum; anterior and median metatarsi rather thick, equalling the 3rd joint in length, this one as well as the 2nd joint brownish. Posterior femora rather long, moderately swollen; tibiæ much shorter than the femora with external spurs very short, interno-median one rather long, supero-internal shorter than the inferior one.

Elytra extending somewhat beyond the pronotum, smoky with posterior margin blackish, a little pubescent; mirror large, partly concealed under the pronotum; lateral field blackish with extreme margin white.

♀. Head and legs as in male. Pronotum rufous, longer than wide, very slightly narrowing in front. Abdomen blackish; sub-genital plate rather large, rounded, black. Ovipositor rather short, thick, straight, with apical valves smooth, rather narrow (fig. 5).

Length of body ♂ 10·5 mm.; ♀ 11 mm.; pronot. ♀ 4·5 mm. ♀ 3 mm.; post. fem. 7 mm. elytra 2 mm.; ovipositor. 6 mm.

Numerous examples of both sexes of this species have been collected at Sipora; Padang, West Sumatra; and Pulau Tello, Batu Islands.

Gen. **Ornebius** Guer.

18. **Ornebius karnyi** n. sp.

Types: 1 ♂, Sipora, 11 October, 1924; 1 ♀, Siberut, 11 September, 1924.

♂ (fig. 9). Rather large, brown covered with silver grey scales. Head small, strongly flattened; frontal rostrum very narrow, neatly furrowed; face yellowish, the protuberance feebly projecting. Palpi yellowish; 4th joint of the maxillary ones a little shorter than the 3rd, 5th equalling the 3rd, triangular, moderately enlarged. Antennæ yellowish with a few distant, very neat, black rings; cheeks yellow, with a very distinct limit behind the eyes.

Pronotum elongate, but simply convex backwards and scarcely wider than in front; lateral lobes narrowly lined with yellow. Abdomen brown above, yellowish beneath. Sub-genital plate rounded; anal valves in very bad state, but showing a hook-like process, curved upwards.

Legs light rufous. Anterior tibiæ with a round internal tympanum; anterior and median metatarsi short, equalling the 3rd joint; 2nd joint divided. Posterior femora moderately swollen, rufous; tibiæ with apical spurs short, except the medio-internal one; posterior metatarsi long, rather thick presenting 7—8 external, 3—4 internal denticles; 3rd joint small, slender.

Elytra extending a little beyond the pronotum, with posterior margin strongly darkened; mirror concealed up to the anterior third; lateral field yellowish with a brown band.

♀ (immature). Head and legs as in male. Pronotum a little longer than wide, with parallel sides, very slightly narrowing in front. Abdomen feebly dilated. Ovipositor incompletely developed.

Length of body ♂ 12 mm., ♀ 13·5 mm.; pronot. ♂ 4·5 mm.; elytra ♂ 1·9 mm.

Gen. **Arachnocephalus** Costa.

19. **Arachnocephalus breviceps** n. sp.

Types: 1 ♂, Siberut, 22 September, 1924; 1 ♀, Sipora, 15 October, 1924.

Medium size, apterous, covered with numerous whitish, greyish and yellowish brown scales. Head with frontal rostrum wide and extremely short (fig. 6), the face being swollen but without a well defined protuberance as in the other species. Palpi brown with greyish scales; 4th joint of the maxillary palpi a little shorter than the 3rd and the 5th, the latter feebly enlarged, truncated at apex. Antennæ yellowish.

Pronotum elongate, very slightly narrowing in front, with anterior and posterior margins straight, sides a little convex; disk covered with very numerous scales; lateral lobes yellowish white.

Abdomen rather narrow, a little enlarged in the middle, covered with yellowish brown scales. Cerci long, yellowish. ♂ Supra-anal valve rounded with two tufts of long hairs on the apical margin and two small black spots; inferior valves prolonged by a short, rather thick, cylindrical process directed upwards but entirely concealed under the supra-anal valve; sub-genital plate rather large, sub-acute at apex, blackish, a little shining. ♀. Sub-genital plate small, a little notched. Ovipositor short and rather thick, very slightly curved upwards; apical valves small, lanceolate, no wider than the stem.

Legs moderately long, covered with brown and whitish scales Anterior tibiæ non-perforated; anterior metatarsi equalling the 3rd joint. Posterior femora rather thick with an oblique band of whitish scales at their external face; tibiæ as long as the femora with external spurs very short, supero-internal shorter than the inferior one, median one rather long; posterior metatarsi long, rather slender, armed with a few small denticles on the superior margins.

Length of body 9 mm.; pronot. 3·2 mm.; post. fem. 6 mm.; ovipositor 3·8 mm.

This species is quite remarkable by the shape of the head which is very different of the other *Arachnocephalus*. Numerous examples have been collected at Sipora; Siberut; and Pulau Tello, Batu Islands.

Sub fam. ACANTHOPLISTINÆ

Gen. **Pteroplistus** Br.

20. **Pteroplistus platyxiphus** (Haan.).

One ♂, 3 ♀, 1 ♂ larva. Sipora, (H.H.K.).

The male of this species had not yet been described. Its general aspect is that of the female. Elytra (fig. 7) extending to the apex of abdomen, widely rounded; speculum wide, angular in front, rounded backwards, divided by two very close veins a little before the middle; 6 chords forming two groups, one of three long ones and one of three short coming from the angle of the anal vein; apical field very short; mediastinal vein with numerous, nearly perpendicular branches. Sub-genital plate large triangular at apex and presenting a small, tuberculiform lobe on each side. Genitalia formed of a large divided piece, two assymetric hooks and a very long style curved upwards (fig. 8).

Sub-fam. TRIGONIDIINÆ

Gen. **Metioche** Stal.

21. Metioche vittaticollis flavipes Sauss.

One ♂ Sipora, 1 ♀, Siberut (H.H.K.).

22. Metioche karnyi Chop.

Numerous examples of both sexes from Sipora and Siberut (H.H.K.).

This species, described from Sarawak, must be widely distributed in the Malaysian sub-region.

23. Metioche karnyi var. **albifrons** n. var.

Types: 1 ♂, 1 ♀, Siberut, September 1924 (H.H.K.).

Paratypes: numerous specimens from the same locality.

Among the long series of this species collected by Dr. Karny, a certain number of specimens show a very peculiar ivory white coloration of the forehead; they do not differ in other respects from the typical specimens, but this character is sufficiently striking to name this variety.

Gen. **Homœoxipha** Sauss

24. Homœoxipha lycoides (Walk.).

One ♀ Siberut, (H.H.K.)

Gen. **Anaxipha** Sauss.

25. Anaxipha longipennis (Serv.).

Several ♂ and ♀ Siberut (H.H K.).

26. Anaxipha maritima (Sauss.).

One ♀ Sipora; 1 ♂, 1 ♀, Siberut (H.H K.).

27. Anaxipha longealata Chop.

One ♀ Siberut (H.H.K.).

This species was known only from the type specimen from Sarawak.

28. Anaxipha maculipes n. sp.

Types: 1 ♂, Sipora, 15 October, 1924; 1 ♀, same locality, 21 October, 1924.

Rather large, elongate, pale yellow with a few reddish brown spots on the legs. Head short; forehead very sloping; eyes rounded. Palpi yellow; 4th joint of the maxillary ones a little shorter than the 3rd, 5th nearly equal to 4th, triangularly widened. Antennæ yellow.

Pronotum smooth, pale yellow, very slightly narrowing in front; anterior margin straight, posterior one a little sinuated; lateral lobes yellow. Abdomen and cerci yellow.

Legs rather long, yellow, pubescent. Anterior tibiæ perforated either side. Median femora adorned with a small reddish spot near the apex of the external face. Posterior femora with a small spot of the same colour towards the middle and another one near the apex.

♂. Sub-genital plate notched at apex with a small tubercle in the bottom of the notch. Elytra wide, yellow with a slight brown tinge before and behind the mirror; this one is large and wide; diagonal vein rather short, sinuated; lateral field nearly transparent except along the veins which are opaque, whitish; 3 complete and one incomplete veins. Wings caudate, a little darkened.

♀. Ovipositor with apical valves occupying half the total length, rather strongly crenulated. Dorsal field of elytra presenting 4 nearly parallel, rather elevated, united at apex veins; transverse veinlets elevated, forming rectangular areolæ; lateral field as in male. Wings caudate.

Length of body 7 mm.; length with wings 10·5 mm.; post. fem. 5·5 mm.; ovipositor 3 mm.

Gen **Paratrigonidium** Br.

29. Paratrigonidium fuscocinctum Chop.

Five ♂, 2 ♀, Siberut (H.H.K.), 1 ♂, Sipora (C.B.K. and N.S.).

Sub-fam. ENEOPTERINÆ

Gen. **Nisitra** Walk.

30. Nisitra hyalina Sauss.

This species seems to be the most common Gryllid on the Mentawi Islands; a great number of specimens from Siberut, Sipora and North Pagi Id. (C.B.K. and N.S.); also 1 ♀ from Padang, West Sumatra (H.H.K.).

Gen. **Cardiodactylus** Sauss.

31. Cardiodactylus novæ-guineæ de Haan.

Two ♀, 3 larvæ, Siberut (H.H.K.); 1 young ♂, Sipora (C.B.K. and N.S.; 1 ♂, North Pagi Id. (C.B.K. and N.S.); 1 ♂, 1 ♀, 5 larvæ, Pulau Tello, Batu Islands (H.H.K.); 1 young ♀, Padang, W. Sumatra (H.H.K.).

32. Lebinthus truncatipennis n. sp.

Type: 1 ♀, Sipora, 9th October, 1924 (H.H.K.).

Allotype: 1 ♂, Sipora, October 1924 (C.B.K. and N.S.); coll. Chopard.

♀ (fig. 10). Rather small, brownish, finely pubescent. Head a little wider than the pronotum; forehead a little sloping, adorned with four feebly visible brown bands; frontal rostrum short and wide, truncated at apex; face presenting a wide transverse brown band; cheeks yellow. Palpi rather long, testaceous, mottled with brown; 3rd and 4th joints sub-equal in length, 5th scarcely longer, weakly enlarged at apex. Antennæ very slender, yellowish brown. Eyes rather big, rounded; ocelli very small, the anterior one at apex of the rostrum.

Pronotum transverse, with anterior margin feebly concave, posterior margin straight; disk rufo-testaceous with 8 brown spots along the posterior margin; lateral lobes presenting a wide blackish band, their inferior margin ascending backwards. Abdomen brownish, very pubescent. Ovipositor rather long and slender with apical valves small, lanceolate, smooth.

Legs rather short, pubescent, mottled with brown. Anterior tibiæ perforated with an external, oval tympanum; metatarsus shorter than the third joint. Posterior femora thick, striated with brown externally; tibiæ serrulated and armed with 4 spines on each margin, the external short chiefly the 4th one; medio-internal spur much longer than the superior and inferior ones; external spurs short but the median one a little longer than the other two; metatarsus equalling the other two joints together, brown at apex, armed with two apical spurs and 4 external, 1 internal denticles above.

Elytra short, obliquely truncated at apex. Dorsal field with 5 parallel veins; lateral field rather large, a little darkened in its superior part, presenting 4 parallel, plain veins.

♂. Very similar to the female in its general shape and aspect. Elytra (fig. 11) covering the base of abdomen, somewhat obliquely truncated at apex, with a feebly pubescent surface; anal vein rounded; 3 chords extending up to the apex of elytra; speculum small, round, united to the anal vein by a weak small vein which seems to be the diagonal vein; no apical field; lateral field with 5 parallel, regular veins. Sub-genital plate navicular, feebly truncated at apex; genitalia long and narrow (fig. 12).

Length of body 13 mm.; pronot. 2·6 mm.; post. fem. 11·5 mm; elytra ♂ 3·8 mm, ♀ 2·1 mm.; ovipositor 9 mm.

This species is very close to *L. bitæniatus* Stål, but the male elytron presents a small, rounded mirror which is quite obliterated in *bitæniatus* and the elytra of the female are shorter and more obliquely truncated.

Gen. **Hetrotrypus** Sauss.

33. **Hetrotrypus buqueti** Sauss.

One ♂, Sipora (H.H.K.), and 2 ♀ (C.B.K. and N.S.)

I consider these specimens as *H. buqueti* although the shape of the male genitalia (fig. 13) is somewhat different from that of the specimens from Java, typical locality of the species.

34. **Hetrotrypus karnyi** n. sp.

Types: 1 ♂, 1 ♀, Siberut, September 1924 (H.H.K.).

Paratypes: 5 ♂, 1 ♀, Siberut (H.H.K.), 1 ♀, Siberut (C.B.K. and N.S.), 2 ♂, Sipora (C.B.K. and N.S.).

♂. Rather short and wide; pale testaceous. Head testaceous, pubescent; frontal rostrum as wide as first antennal joint, with parallel margins, slightly convex above. Ocelli very small. Face and palpi yellow; 4th joint of the maxillary palpi a little shorter than the 3rd, 5th long, feebly enlarged at apex. Antennæ slender, yellow at base, brownish with a few yellow rings distad.

Pronotum slightly narrowing in front, with anterior and posterior margins straight; disk convex, very pubescent, yellowish with a brown band along the posterior margin; lateral lobes concolorous with inferior margin slightly ascending backwards. Abdomen yellowish; sub-genital plate rather short; genitalia forming a small, notched piece (fig. 14). Cerci long.

Legs yellowish; femora with a light brown ring before the apex, tibiæ feebly ringed with brown. Anterior tibiæ darkened above, weakly swollen at base, perfrated either side; metatarsus shorter than the 3rd joint. Posterior femora rather strongly dilated, pubescent, yellowish with three light brown bands above; tibiâ with four rather long spines on each margin, besides denticulated as follows. external margin 6.5.4.1; internal margin 4.0.0 0; supero-internal spur equalling the metatarsus which is armed with a single row of 5 denticles.

Elytra wide, testaceous; mirror divided into three nearly equal parts; diagonal vein short and furcate towards the anterior third; 7 oblique veins 4 of which long, slightly diverging; chords angulate; apical field short with four sectors; lateral field with mediastinal vein bearing very numerous, almost perpendicular branches. Wings not visible beyond the elytra.

♀. General shape and colour of the male. Pronotum not narrowing in front with posterior margin slightly sinuate. Elytra rather short, a little widening towards the middle, then rather strongly narrowing to the apex; surface somewhat pubescent; dorsal field with three a little oblique, parallel, rather close free veins and 3 branches of the discoidal which are much more apart and more oblique; transverse veinlets scarce and irregular; lateral field with mediastinal vein straight, bearing 12 parallel branches. Wings as in the male.

Ovipositor rather long and slender, with apical valves very small, ridged, divided towards the basal third by a deep, oblique furrow.

Length of body 13·5 mm.; length with wings 16 mm.; post. fem. 12·5 mm.; ovipositor 11·5 mm.

This species is very close to *H. testaceous* Chop., the nervation of the male elytra being almost exactly the same in both species; but *H. karnyi* is shorter and wider with wings no longer than the elytra. In its general shape it looks much like *H. modulator* Sauss., from the Philippine Islands.

Gen. **Itara** Walk.

35. **Itara microcephala** Haan.

Three ♂, 4 ♀, Sipora (H.H.K.); 2 ♂, Siberut (H.H.K.); 1 ♂ Pulau Tello, Batu Islands (H.H.K.).

It seems evident that I made a mistake when figuring the genitalia of this species in *Ann. Soc. ent. Fr.*, (1925), p. 313. From the studies I have made since then of the genitalia of different species of *Itara* and *Heterotrypus*, I have become quite convinced that this figure is that of the genitalia of an *Heterotrypus*. Very probably, by an inconceivable mistake, my preparations have been mixed and the figure 37 corresponds to *Heterotrypus jacobsoni* whereas figure 46—47 should be referred to *Itara microcephala*. In the specimens from the Mentawi Islands, the genitalia (fig. 15) are nearly exactly similar to those of the specimens from Sumatra.

Gen. **Calyptotrypus** Sauss.

36. **Calyptotrypus helvolus** Sauss.

One young example belonging probably to this species, Siberut (H.H.K.).

Gen. **Madasumma** Walk.

37. **Madasumma grandipennis** n. sp.

Type: 1 ♂, Pulau Tello, Batu Islands, November 1924.

♂. Large, dark brown, rather pubescent. Head small, round occiput and forehead dull brown, pubescent; frontal rostrum narrow, furrowed above, with parallel margins; face yellowish brown. Palpi brown; 4th joint of maxillary palpi shorter than 3rd, 5th rather weakly enlarged at apex. Antennæ rufous with first joint brown. Eyes rather small, rounded; ocelli very big, yellow, nearly contiguous and united by a yellow spot.

Pronotum very transverse, anterior margin straight, posterior rather strongly convex; disk feebly convex; dark brown, pubescent; lateral lobes concolorous with inferior margin slightly ascending forwards. Abdomen brownish; sub-genital plate rather short, rounded at apex. Cerci long, yellowish brown. Genitalia small, in the shape of a plain forceps (fig. 17).

Anterior and intermediate legs short, very dark brown; anterior tibiæ thick, a little swollen at base, external tympanum almost square, internal elongate, partly covered by the superior margin of the swollen part of the tibia; metatarsi very short. Posterior femora rather long and feebly dilated, uniformly rufous brown; tibiæ flattened above, armed with 7 rather small, rufous spines on each margin; metatarsi very short, armed with two spines above, besides the apical spurs.

Elytra large (fig. 18); apical field specially much lengthened; speculum very small, round, divided towards the middle; enveloping vein and chords very distant from the mirror; diagonal short, 6 oblique veins, 3 of which a little longer than the others; anal vein broken at right angle; apical field with 5 sectors and a wide reticulation. Wings a little longer than the elytra.

Length of body 26 mm.; length with wings 38 mm.; pronot. 5 mm.; ant. fem. 6·5 mm.; post. fem. 17 mm.; elytra 27 mm.

Allotype: 1 ♀, Sipora, October 1924 (C.B.K. and N.S.).

♀. Very large and stout. Head, pronotum and legs as in the male; ocelli smaller. Sub-genital plate rather large, deeply notched. Ovipositor rather long, strong, a little sinuate, the apical part curved downwards; apical valves long, narrow, furnished with strong tubercles beneath (fig. 19). Elytra wide, a little pubescent, presenting about 15 equally distant, weakly oblique veins; transverse veinlets numerous, forming a rather regular reticulation, the meshes of which are in the shape of long squares on the disk, but become polyhedral in the anterior part of the apical field where the venation is rather confused; mediastinal vein bearing 15 oblique, regular veins.

Length of body 32 mm.; length with wings 47 mm.; elytra 35 mm.; post. fem. 22 mm.; ovipositor 25 mm.

This species is one of the largest of the genus; the male is distinguishable for its short anterior legs and its very large elytra with small speculum; the female looks rather like *M. grandidieri* Sauss., from Madagascar, but it is stouter with internal tympanum of anterior tibiæ split-like, ovipositor thicker and more regular reticulation of the elytra.

Two immature females were been collected on Siberut, September 1924 (H.H.K.).

38. Madasumma karnyi n. sp.

Types: 1 ♂, 1 ♀, Siberut, September 1924 (H.H.K.).

Paratypes: Same locality, 5 ♂, 1 ♀.

Also at Sipora, October 1924 (H.H.K.), 1 ♀, 2 immature ♂.

♂. Rather large and elongate, testaceous brown mottled with brown. Head small, rounded, pubescent; frontal rostrum a little narrower than the first antennal joint, with parallel margins. Palpi testaceous, the 4th joint of maxillary palpi shorter than the 3rd, 5th large, triangular. Antennæ brown with a few yellowish rings. Ocelli big, nearly contiguous.

Pronotum scarcely narrowing in front, with anterior margin straight, mottled with brown, posterior margin sinuated; disk rounded, very pubescent; lateral lobes concolorous, slightly ascending forwards. Abdomen yellowish brown; sub-genital plate rather long, sub-acute at apex. Genitalia large, presenting a large, superior, bifid piece and two pairs of hooks directed downwards (fig. 20).

Legs rather long, testaceous brown, mottled with brown, very pubescent. Anterior tibiæ scarcely dilated at base, perforated with two tympani the external a little larger than the internal one. Metatarsi short, pubescent, 3rd joint of the tarsi very slender. Posterior femora, long, narrow, presenting a row of small brown spots along the inferior margin and a few larger spots about the middle of the exterior face; tibiæ bearing 5 spines on each margin.

Elytra (fig. 21) rather narrow, yellowish brown with a small yellow spot at the external angle of the mirror; mirror rather large, somewhat lengthened divided a little above the middle; diagonal vein rather short, straight; 6 oblique veins of which 2 long ones, sinuated, the others short, straight; 6 oblique veins of which 2 long ones, sinuated, the others short, coming from the angle of the anal vein; anal vein slightly sinuated before the angle; anal field large with somewhat projecting veins, not reticulated; apical field presenting 3 veins and a very wide reticulation. Wings perceptibly longer than the elytra.

♀. A little larger than the male; similar general shape and coloration. Elytra presenting a few yellow and blackish spots along the edge; dorsal field with 3 free veins uniting before the apex and 8 branches of the discoidal vein; these branches are very distant at their base, nearly broken towards the middle, and very close to one another in their apical part where they are longitudinal; reticulation irregular and close, forming large elongate cells, disposed on two rows in the basal part.

Ovipositor long, rather slender, with apical valves small, elongate, shagreened at their external face, armed with 4 inferior and 2 external teeth (fig. 16).

Length of body ♂ 23 mm., ♀ 25 mm.; length with wings ♂ 34 mm., ♀ 37·5 mm.; post. fem. ♂ 17 mm., ♂ 19·5 mm.; elytra ♂ 22 mm., ♀ 25 mm.; ovipositor 20 mm.

This species is rather close to *M. bakeri* Chop.; the male is remarkable by its apical field of elytra with a very wide reticulation, the female by the elytral veins which are kneed in the middle.

Gen. **Euscyrtus** Guer.

39. Euscyrtus concinnus (Haan.).

Seven ♂, 10 ♀, Siberut, (H.H.K.), 1 ♂, 5 ♂, Sipora (H.H.K.), 1 ♀, Pulau Tello, Batu Islands, (C.B.K. and N.S.).

Gen. **Podoscirtus** Serv.

40. Podoscirtus javanus Sauss.

One ♂, Sipora (C.B.K. and N.S.).

Podoscirtus fasciatus (Haan.).

One ♂, 1 ♀, Siberut (H.H.K.), 1 ♂, 1 ♀; Sipora (H.H.K.).

41. Podoscirtus lineiceps n. sp.

Type: 1 ♀, Siberut (H.H.K.), 15 September, 1924.

Cotype: 1 ♀, same locality.

♀ (fig. 23). Size rather small, shape elongate; testaceous brown, rather pubescent. Head as wide as pronotum in front, feebly convex; forehead adorned with four longitudinal, narrow, brown bands, uniting forwards on the rostrum; frontal rostrum a little narrower than the first antennal joint, convex above, rounded at apex. Eyes big, rounded; ocelli very small, the anterior almost at apex of the rostrum. Face and cheeks wholly light yellow; a brown band behind each eye extending on the lateral lobes of pronotum. Palpi yellow; 4th joint a little shorter than 3rd, 5th elongate, weakly enlarged at apex. Antennæ yellowish, 1st joint very large, mottled with brown.

Pronotum transverse, very pubescent; disk convex, testaceous, spotted with brown; lateral lobes with superior part brown, inferior yellow, inferior margin ascending backwards. Abdomen brownish. Ovipositor rather short, apical valves small, armed with 4 strong teeth externally (fig. 22).

Legs rather long, testaceous, pubescent. Anterior femora with a small brown ring before the apex; tibiæ rather strongly dilated at base, in the middle and at apex, perforated with two oval drums. Middle femora mostly darkened above; tibiæ with three brown rings. Posterior femora feebly dilated, very pubescent, testaceous with three brown spots above and on the internal face; tibiæ yellowish with 6 brown spots above, 4 rather long, pubescent spines on each margin; external spurs very small, the middle one longer than the other two; infero-internal spur short, middle and specially superior long; metatarsi long, denticulated on the external margin only; 3rd joint long and slender.

Elytra testaceous brown, rather narrow; dorsal field with 8 very oblique and distant veins, of which 3 are free and 5 from the discoidal; transverse veinlets regular and forming square areas; lateral field transparent with 2 veins and 6 branches of the mediastinal. Wings a little longer than the elytra.

Length of body 11 mm.; length with wings 20 mm.; pronot. 2·5 mm.; elytra 14 mm.; ovipositor 8·5 mm.

Gen. **Aphonomorphus** Rehn.

42. Aphonomorphus punctatus (Haan).

One ♀, Siberut (H.H.K.).

43. Aphonomorphus gracilis Chop.

One ♂, Siberut (C.B.K. and N.S.), 1 ♂, 2 ♀, Pulau Tello, Batu Islands, November 1924 (H.H.K.).

This species is rather widely distributed from the Philippine Islands to the Malaysian sub-region. It is also rather variable, chiefly as concerns the coloration. Among the examples above recorded, the female from the Mentawi Islands presents a brown spot on the anterior tibiæ; and one of the females of the Batu Islands is large with lateral field of the elytra transparent and dorsal field greyish.

44. Aphonomorphus pallipes n. sp.

Type: 1 ♂, Siberut (H.H.K.), 30th September, 1924.

♂ (fig. 24). Medium size, elongate. Head yellowish with a few small brown spots on the occiput; forehead flat; frontal rostrum a little narrower than the first antennal joint, flat, truncated at apex; ocelli very small. Face and palpi yellow; 4th joint of the maxillary palpi shorter than the third, 5th securiform. Antennæ yellowish with 1st joint brown.

Pronotum slightly narrowing in front; anterior margin straight, posterior one strongly sinuated, nearly angular in the middle; disk much rounded, pale yellow, with a brown triangular spot in the middle of the anterior part and a few small, brown, piliferous spots; disk with a rather abundant whitish pubescence and a few brown bristles, lateral lobes yellow with a small brown spot in the middle. Abdomen yellowish. Cerci yellow, ringed with brown. Sub-genital plate rather long, rounded at apex; supra-anal valve spotted with brown, truncated at apex. Genitalia small, bifid.

Legs short, pubescent. Anterior and median femora and tibiæ rather strongly dilated at base and perforated at their internal face; metatarsi much shorter than the 3rd joint of the tarsi. Posterior femora rather slender, yellowish with a few small brown points at their external face, a larger brown spot towards the middle and a brown ring before the apex; tibiæ pubescent, yellow with a brown spot about the anterior third and another larger one past the middle; 6 yellow with brown extremity spines on each margin; external spurs very short; infero-internal spur also very short, the other two longer chiefly the median one which is equal to the last spine; metatarsi strong, very pubescent, brown, with 3—4 external denticles, 1 only at apex of the internal margin.

Elytra entirely of a dark grey, pubescent; dorsal field with 6 very regular veins, the 4th and 5th united at base, the 6th coming from the discoidal; transverse veinlets forming rather regular, elongate areolæ; lateral field with 6 veins equally distant, of which 2 short ones along the anterior margin and 3 branches of the mediastinal vein. Wings a little longer than the elytra, greyish.

Length of body 12 mm.; length with wings 19 mm.; pronot. 3 mm.; post. fem. 9 mm.; elytra 12·5 mm.

A pretty small species which is quite characteristic among the *Aphonomorphus* by its coloration.

Spolia Mentawiensia

Cicadidæ

By J. C. MOULTON, *O.B.E., M.A., D.Sc.*

formerly Director, Raffles Museum.

[The late Dr. J. C. Moulton was Director of the Raffles Museum from July, 1919 to October, 1923, when he resigned to become Chief Secretary to Government, Sarawak. He had previously served in that State from 1909 to 1915 as Curator of the Sarawak Museum. He died in June, 1926. This paper, prepared the year previously, was one of the last he wrote. The Cicadidæ had become a favourite group of his and his monograph "The Cicadas of Malaysia" was published in the Journal of the Federated Malay States Museums (Vol. XI, 1923, pp. 69—182, pls. I—V). C. Boden Kloss.]

I am indebted to Mr. C. Boden Kloss, Director of Museums, Straits Settlements and Federated Malay States, for the privilege of examining a small but interesting collection of Cicadas from the Mentawi Islands off West Sumatra, obtained by himself, Mr. N. Smedley and Dr. H. H. Karny in 1924[1]. Although it contains no new species the collection is of interest in that it adds these little known islands to the distribution of many Malaysian species.

In the following list, excluding two species which were collected at Padang in Sumatra and one on the Batu Islands (and not on the Mentawi Group), only two of the ten now recorded were hitherto known definitely from the Mentawi Islands. Most of them are common Malaysian species, whose occurrence on these islands is to be expected. There are however two species, which are of particular interest: *Pomponia decem*, hitherto only known from Borneo and Banguey Id., which is represented in this collection by five specimens from the islands of Siberut and Sipora; and *Cryptotympana epithesia*, obtained on Siberut, a very rare species known before only from Borneo, Sumatra and Nias Island. The examples of both these species in this collection differ slightly from the typical form and if longer series were available would probably merit sub-specific distinction.

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[1] *Vide* Bull. Raffles Mus., No. 1, Sept. 1928, pp. 2—4.

The apparent absence of certain species and genera which one would expect to find on these islands is perhaps just as interesting as the presence on them of unexpected species. In this connection it is curious that no species of the genus *Cosmopsaltria* were collected. Thirteen species of this genus are known from Malaysia: eight in Borneo, five in Sumatra, and for the most part they are common species wherever they occur. The occurrence of but one out of the thirteen in Java, and so far none at all on the Mentawi group of islands or from any of the islands off the west coast of Sumatra is worth notice.

The absence of the common *Platylomia spinosa* is a little surprising. It is still perhaps to be found there. *Platyplcura nobilis*, a small species and not often met with, ranges from Assam and Burma through the Malay Peninsula to Borneo, Sumatra and Java, and should probably be found in the Mentawi Islands. The big *Pomponia adusta* with similar distribution is another "possible".

The number in brackets after each species in the following list refers to the number given to that species in my paper on the Cicadas of Malaysia, published in the *Journal of the Federated Malay States Museums*, Vol. XI, pt 2, December 1923, synonymy, geographical distribution and other notes.

1. **Dundubia vaginata** (Fabricius).

Siberut, 1 ♀; Pagi Islands, 1 ♂.

Described by Fabricius in 1787 from Sumatra. A common oriental species ranging from India and China through Malaysia to North Australia. I do not know of any record of it from the Mentawi group of islands. (No. 1).

2. **Dundubia rufivena** (Walker).

Siberut 1 ♂, 13 ♀ ♀; Sipora 1 ♂, 6 ♀ ♀.

Described by Walker in 1850 from Java. Common throughout Malaysia. Already recorded from Nias and "Mentawi". Females always predominate in collections. (No. 2).

3. **Pomponia decem** (Walker).

Siberut 1 ♀; Siberut. 2 ex. coll. H. H. Karny.

Sipora 1 ♂, 1 ♀.

Slightly smaller than the typical form: length (excluding tegmina) ♂ 42 mm., ♀ 43—44 mm. Exp. tem. ♂ 126 mm., ♀ 130—132 mm. Breddin gives 42—49 mm. and 135—145 mm. respectively, for *diffusa* from Borneo, which is synonymous with *decem* Walker.

In the Sipora ♂ the opercula are not quite so broadly truncate as in typical *decem*, but in a long series of Bornean specimens the opercula vary slightly in this respect, and I hesitate to give these island forms sub-specific distinction on the slight difference in size and on this small difference in the opercula of the one male collected. The species was described by Walker in 1857 from Sarawak. Hitherto only known from Borneo and Banguey Island. (No. 35).

4. Pomponia picta (Walker)

Padang, West Sumatra, 3 ♂ ♂ .

Described by Walker in 1868 from Sumatra. Also known from the Malay Peninsula, Borneo, Java and New Guinea. Possibly the same as *P. fusca* (Oliver) described in 1791 from West Coast of Sumatra. (No. 38).

5. Pomponia lactea (Distant).

Sipora 1 ♂ .

Described by Distant in 1887 from Sumatra. Also known from the Malay Peninsula and Java, and doubtfully from Borneo. (No. 39).

6. Purana nebulilinea (Walker).

Siberut 1 ex. coll. H. H. Karny.

Pulau Tello, Batu Islands 1 ♀ .

Described by Walker in 1857 from Sumatra. Also known from the Malay Peninsula and Borneo. Common in the last named country. (No. 62).

7. Naua albigutta (Walker).

Siberut 1 ♂ , 1 ♀ ; Padang, Sumatra 33 ♂ ♂ , 9 ♀ ♀ .

Described by Walker in 1856 from Sumatra. Also known from the Malay Peninsula, Borneo and Java. "A somewhat common insect in the localities where it has been collected." (Distant) (No. 65).

8. Rihana germana (Distant).

Siberut 1 ♂ ; Padang, Sumatra 1 ♀ .

Described by Distant in 1888 from Burma. Known from Siam, Malay Peninsula, Borneo, Sumatra and Java. I have not seen the type and rather suspect the Malaysian forms are separable subspecifically. The two examples in this collection differ from each other slightly in the shape of the head, and both differ slightly in this respect from Distant's figure. (No. 76).

9. Cryptotympana epithesia (Distant).

Siberut 1 ♂, coll. H. H. Karny.

The opercula are rather more pointed than in typical *epithesia* from Borneo. The measurements of this ♂ are: length (excl. tegm.) 50 mm., exp. tegm. 140 mm., as against 44 mm. and 134 mm. respectively, recorded by Distant for the type.

A ♂ from Sumatra collected by Mr. E. Jacobson in 1925, measures 50 mm. and 152 mm. But in that specimen the opercula are typical in being broadly rounded at apex instead of bluntly tapered as in the Siberut example.

With longer series it would no doubt be easy to recognize distinct sub-species for Borneo, Sumatra and Siberut. But it is a rare species, hitherto only known from two Bornean males in the British Museum, described by Distant in 1888, two males from Nias Island in the F. M. S. Museums and a data-less female in the Raffles Museum. Mr. Jacobson sent me a female from Fort de Kock, Sumatra, collected in 1924, and a male from the same locality collected in 1925—which form the first record of this species in Sumatra. (No. 85).

10. Huechys sanguinea (de Geer).

Pulau Tello, Batu Islands 1 ex. coll. H. H. Karny.

Described in 1773 from China. Common in the Malay Peninsula, known from Sumatra and Borneo and said by Walker to inhabit Java. A species of wide range in the Oriental Region. (No 105).

11. Huechys incarnata (Germar).

Padang, Sumatra 69 ♂♂, 62 ♀♀.

Described by Germar in 1834 probably from Java. Also known from Sumatra, Celebes and Amboyna. Two freshly emerged specimens in which the lateral tumescences of the pronotum alone are black, the rest of the head and thorax bright red, are of interest. The fine series collected shows many curious variations in the neuration of the tegmina. (No. 106).

12. Muda virguncula (Walker).

Siberut 4 ♂♂, 5 ♀♀ (6 ex. coll. H. H. Karny).

Sipora 5 ♂♂, 4 ♀♀ (5 ex. coll. H. H. Karny).

Described by Walker in 1856 from Singapore. Also known from Sumatra, Borneo, Java, Banguey Island and New Guinea.

M. obtusa (Walker) may prove synonymous. Distant records a ♀ (as *Muda concolor*) from Mentawi. *M. obtusa* is separated on account of its smaller size (exp. tegm. 33 mm. instead of 40—45 mm.), and for having the longitudinal veins to the radial areas of the tegmina obliquely angulated. The series in this collection covers both "species" for size, and might be allotted to either on venation. Closer comparison of the types in the British Museum and with longer series is necessary. (No. 125).

13. Mogannia sesioides (Walker).

Siberut 1 ♂, 9 ♀♀ ; Sipora 2 ♀♀ .

Described by Walker in 1867 from Sumatra, where it is common. Also recorded from the Malay Peninsula and the Mentawi Islands. (No. 137).

Spolia Mentawiensia

Cercopidæ

Par. V. LALLEMAND, *M.D.*

[Dr. Lallemand has supplied descriptions of two new Cercopids found amongst the material of this family obtained by Dr. H. H. Karny, Mr. N. Smedley and myself during our visit in 1924 to the Mentawi Islands off the west coast of Sumatra[1]: and from the named insects returned by him a list has been compiled which records all those secured, except possibly a few duplicates retained by the determinator.—*C. Boden Kloss.*]

Trichoscarta bodeni n. sp.

Tête, pronotum, prosternum, écusson d'un noir légèrement verdâtre; élytres noirs brillants, bords externe (étroitement), apical (largement) et interne (étroitement et jusqu'a la pointe de l'écusson), brun clair. Sont jaunes: 1°)une bande longitudinale incurvée, longeant le bord interne et s'étendant jusqu'un peu en avant de la pointe de l'écusson, 2°)une bande incurvée en arrière, partant du bord interne au niveau de la pointe de l'écusson, pour arriver au même niveau au bord externe, elle presente un prolongement postérieur entre le cubitus et la suture; 3°)une petite tache ovoide, externe au radius et proche de la base; 4°)deux autres en avant de la patie réticulée une au bord externe, allongée, s'etendant jusque la branche interne du radius et la seconde à l'extrémité du clavus, s'étendant jusque sur le cubitus. Ailes noires, à nervures noires. Abdomen brun, plus clair àla face inférieure. Pattes antérieures et médianes, mésosternum bruns; métasternum, pattes postérieures ocre; rostre ocre, à extrémité brune. Face supérieure du corps recouverte d'une forte villosité rousse.

Pronotum ponctué en stries plus ou moins transversales, à fine carène médiane; écusson transversalement strié, à grande fossette médiane; médian et cubitus réunis sur une certaine longueur sur le tiers basal du corium; deux épines sur les tibias postérieurs.

Longueur totale: 14 mm.

Longueur du corps: 10 mm.

Elytres, longueur: 11 mm., largeur: 4 mm.

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[1] *Vide* Bull. Raffles Mus., No. 1, Sept. 1928, pp. 2—4.

Habitat: Sipora, Mentawi Islands, West Sumatra.

Je dédie cette espèce à Mr. C. Boden Kloss Directeur des Musées Straits Settlements et Federated Malay States.

Ectemnonotum karnyi n. sp.

Tête, pronotum, prosternum bruns à reflets légèrement violets; écusson, élytres morderés, les derniers ont le bord externe très finement rouge; toute la surface de l'insecte est recouverte d'une villosité rousse, dense; ailes noires, à nervures noires, a base rosée; rostre méso et métasternum ocre-brun; abdomen d'un brun rougeâtre légèrement violet; organes génitaux d'un brun plus clair; cuisses brun-rouge, tibias rouges, extrémitée des épines et des tarses noire.

Ocelles situés à égale distance l'un de l'autre et des yeux; pronotum finement ponctué, brillant, à carène médiane mousse peu saillante; deux épines sur les tibias postérieurs, une très petite à la base et une très forte vers l'extrémité.

Longueur: 16 mm.

Habitat, Siberut, Mentawi Islands H. H. Karny.

Je dédie cette espêce à celui qui l'a récoltée.

Family **Cercopidæ**

1. Peuceptyelus maculipes Stal.

One specimen: Siberut, Sept. 1924, C.B.K. and N.S.

2. Clovia conifera Wlk.

One specimen: Siberut, Sept. 1924, C.B.K. and N.S.

3. Clovia affinis Schmidt.

Three Specimens: Siberut, Sept. 1924, C.B.K. and N.S.; Pulau Tello, Batu Islands Nov. 1924, H.H.K.

4. Clovia geata var. **avanescens** Schmidt.

One specimen: Sipora, Oct. 25th, 1924, H.H.K.

5. Plinia ampla Wlk.

Twenty-one specimens: Siberut, Sept. 1924; Sipora, Oct. 1924; North Pagi Is. Oct. 1924, C.B.K. and N.S., and H.H.K.

6. Eoscarta subdolens Wlk.

Three specimens: Sipora, Oct. 9th, 1924; Siberut, Sept. 7th. 1924, H.H.K., C.B.K., and N.S.

7. Eoscarta laternoides Breddin.

One specimen: Siberut, Sept. 1924, C.B.K. and N.S.

8. Trichoscarta bodeni Lall. sp. n.

One specimen: Sipora, Oct. 1924, C.B.K. and N.S.

9. Leptataspis masoni Dist.

One specimen: Padang, W. Sumatra, Nov. 1924, C.B.K. and N.S.

10. **Ectemnonotum karnyi** Lall. sp. n.
One specimen: Siberut, Sept. 12th, 1924, H.H.K.

Family **Jassidæ**

1. **Petalocephala nigrilinea** Wlk.
One specimen: Sipora, Oct. 1924, C.B.K. and N.S.

2. **Petalocephala bohemani** Stal.
One specimen: Siberut, Sept. 1924, C.B.K. and N.S.

Family **Fulgoridæ**

Sub-family ISSINÆ

1. **Gelastyra latifrons** Melichar.
One specimen: Sipora, Oct. 1924, C.B.K. and N.S.

Spolia Mentawiensia

Scorpiones

By Dr. F. KOPSTEIN, *Java*.

Mr. C. Boden Kloss has sent me for examination the small series of scorpions obtained in the Mentawi Islands off the west coast of Sumatra in 1924.[1] There are four species, two of which have a wide distribution while *H. liophysa* was only known from Sumatra and Nias Island and *I. formosus* from Java, Sumatra and Singapore.

Heterometrus liophysa Thor. (*Palamnæus liophysa*).

Siberut	3 ♀ ♀	; pectinal teeth 13/13; 13/14; 12/12.
,,	2 ♂ ♂	; ,, ,, 13/? ; 14/14.
Sipora	1 ♀	; ,, ,, 12/12.
N. Pagi	1 ♀	; ,, ,, 13/13.

All of them young or half grown specimens.

Hormurus australasiæ F.

Siberut	1 pull.	
,,	3 ♀ ♀	; pectinal teeth 6/6.
,,	5 ♂ ♂	; ,, ,, 7/7; 7/8; 7/7; 7/7; 7/7.

Isometrus formosus Poc.

Siberut IX, 1924, 1 ♀ ; pectinal teeth 11/11.

Isometrus maculatus Geer.

Siberut.

A much damaged young example which cannot be determined with sufficient accuracy.

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[1] *Vide* Bull. Raffles Mus., No. 1, Sept. 1928, pp. 2—4.

Spolia Mentawiensia

Araneæ

By EDUARD REIMOSER

(with three text-figures).

This collection of Spiders from the Mentawi Islands, off the west coast of Sumatra, made in the autumn of 1924 by Messrs. C. Boden Kloss, N. Smedley and H. H. Karny,[1] contains more than 300 specimens of which 280 can be determined with certainty. They represent 9 families, with 37 genera and 50 species. Three species are new, and of one species I am describing the male which had not hitherto been known. Species marked with an asterisk* had previously not been taken in the faunistic region of Sumatra.

Fam. **Clubionidæ**

***Corinnomma harmandi** Sim.

2 ♀ ♀ Sipora.

Fam. **Thomisidæ**

Thomisus callidus (Thor.).

2 ♀ ♀ Siberut.

Regillus cinerascens (Dol.).

2 ♀ ♀ Sipora.

***Cebrenninus scabriculus** (Thor.).

1 ♂, 1 ♀ Siberut.

Fam. **Sparassidæ**

***Rhitymna xanthopus** Sim.

2 ♀ ♀ Siberut; 2 ♀ ♀ Mentawi Islands[2].

Heteropoda venatoria (L.).

15 ♀ ♀ Siberut; 2 ♀ ♀ Sipora; 2 ♀ ♀ Mentawi Islands[2].

Heteropoda imbecilla Thor.

4 ♀ ♀ Sipora.

***Thelcticopis modesta** Thor. (fig. 1).

One ♂, 17 ♀ ♀ Sipora; 1 ♂, 10 ♀ ♀ Siberut; 3 ♀ ♀ Mentawi Islands.

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[1] Vide Bull. Raffles Mus., No. 1, 1928, pp. 2—4.

[2] Some specimens labelled "Mentawi" are amongst those collected by Dr. H. H. Karny. It is possible that they come from North or South Pagi, which are the southern islands of the Mentawi Group C. B. K.

The male of this species may be described as follows: cephalothorax: length 7 mm., width 5·5 mm.; abdomen: length 8 mm., width 3·6 mm. Length of the joints of the legs:

	femur	*patella*	*tibia*	*metatarsus*	*tarsus*
I	7·2 mm.	3·6 mm.	7·2 mm.	5·3 mm.	1·5 mm.
II	7 ,,	3·5 ,,	7 ,,	5·6 ,,	1·4 ,,
III	5·3 ,,	2·6 ,,	5·2 ,,	4·7 ,,	1·3 ,,
IV	6·7 ,,	2·8 ,,	6·7 ,,	7 ,,	2·1 ,,

Tibia I has on its underside internally 6, externally 5 spines, and, as in all males of this genus, on either side two lateral spines. Metatarsus I has below 1 pair of spines, and on either side two lateral spines.

The femur of the pedipalp has on its end above 4 spines in a transverse row, and behind these a single spine. The patella of the pedipalp has on its outer and its inner side one spine each. The tibia of the pedipalp has only on its inner side 3 spines; at the end of the outer side a narrow, blunt process can be seen which exceeds the tibia by more than one half of its length. Towards the base there is a short, curved branch of that process. A second process is situated more towards the underside and extends only to the end of the joint. The cephalothorax is red-brown, with a close, white pubescence. The cephalic portion is darker. The mandibles are dark red-brown, the legs light red-brown. The pedipalps are orange, the tibiæ darker, the long process black-brown. The upper side of the abdomen is densely covered with a close, white, silky pubescence and with projecting brown bristles. The dark-brown markings of the distal half show, as in the female, 3 Λ shaped stripes. The black wedge-shaped bar of the underside is traversed by two longitudinal rows of yellow dots.

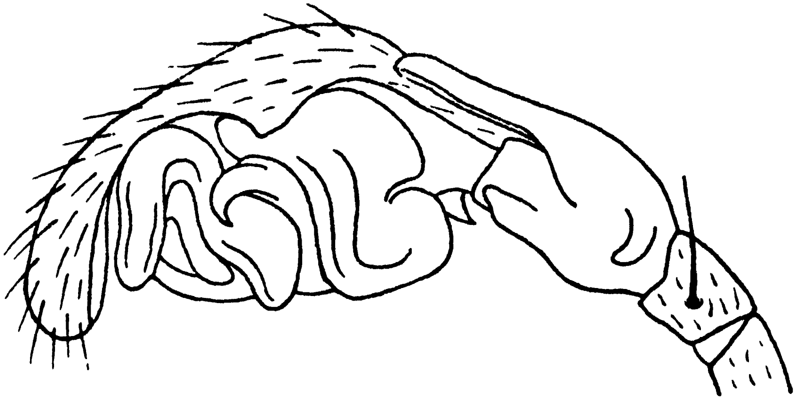

Fig. 1—*Thelcticopis modesta* Thor.
Male Pedipalp

Thelcticopis klossi n. sp. (fig. 2).

♀, cephalothorax 11·1 mm. in length, 8·5 mm. in width; abdomen 15·2 mm. in length, 9·1 in width. Tibia I and II carry 5 pairs of spines on their underside.

Length of the joints of the legs:

	femur	*patella*	*tibia*	*metatarsus*	*tarsus*
I	8·4 mm.	4·5 mm.	7·6 mm.	7·1 mm.	2·8 mm.
II	8·1 ,,	4·4 ,,	7·7 ,,	6·8 ,,	2·6 ,,
III	6·5 ,,	4·2 ,,	5·6 ,,	5·7 ,,	2·2 ,,

The end of the femur of the pedipalps carries above a transverse row of 4 spines, and not far behind a single, median, somewhat longer spine. The tibia of the pedipalps has one spine on either side. On the patella of the pedipalps there project on either side 2 lateral spines, and above at the base, a long spine, and at the end a short, thin spine. The tarsus of the pedipalps bears 3 spines on either side. Cephalothorax and mandibles are dark brown, with white pubescence. Sternum and legs are dark red-brown, the pedipalps light red-brown. The upper side of the abdomen is densely covered with a close, white silky pubescence and projecting short brown bristles; in the front half there is a dark ochreous median bar, broader behind, and in the posterior half a median row of 4 dark ochreous Λ shaped stripes. On the underside of the abdomen there is a grey-brown wedge-shaped bar, going from the epigyne to the spinnerets, which on either side is bordered by a light-yellow line and encloses two rows of brown dots.

Of this species were taken 2 ♀♀ on Sipora, and 1 ♀ on Siberut.

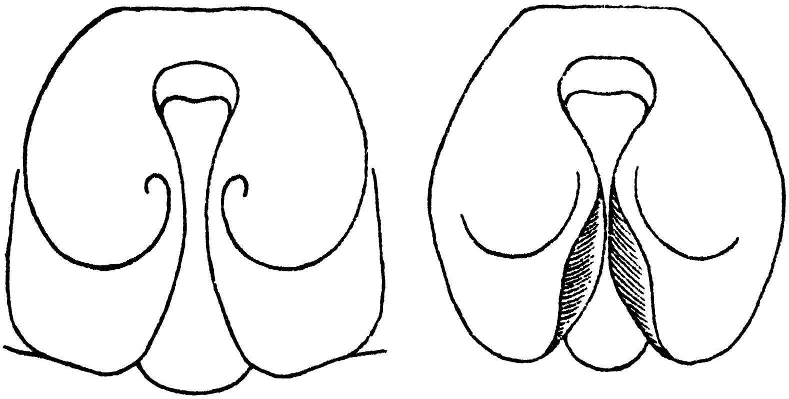

Fig. 2—*Thelcticopis klosssi* n. sp.
Epigyne

Thelcticopis karnyi n. sp. (fig.3).

♀, cephalothorax 9·2 mm. in length, 7 mm. in width; abdomen 12 mm. in length, 8·2 mm. in width. Tibia I below with 6 spines on the outer side, and 5 spines on the inner side.

Length of the joints of the legs:

	femur	*patella*	*tibia*	*metatarsus*	*tarsus*
I	7·7 mm.	4·1 mm.	6·4 mm.	5·7 mm.	2 mm.
II	7·5 ,,	3·8 ,,	6·3 ,,	5·4 ,,	1·9 ,,
III	5·6 ,,	3 ,,	4·9 ,,	4·8 ,,	1·7 ,,
IV	8 ,,	3·7 ,,	6·5 ,,	6·7 ,,	2·3 ,,

The spination of the pedipalps is the same as in *Th. modesta* and *Th. klossi*. Cephalothorax and mandibles are black-brown, with white pubescence. Sternum, legs and pedipalps are light red-brown. As in the preceding species, the upper side of the abdomen is densely covered with a close, white silky pubescence and projecting short brown bristles, but shows a darker brown ground colour. The yellowish median bar in the anterior half, broader behind, and the yellowish Λ shaped bars in the posterior half are less distinctly marked. The underside of the abdomen is marked as in the preceding species: a dark wedge-shaped bar from the epigyne to the spinnerets, on either side bordered by a yellow line, and traversed by two rows of brown dots. Of this species 2 ♀ ♀ were taken on Siberut.

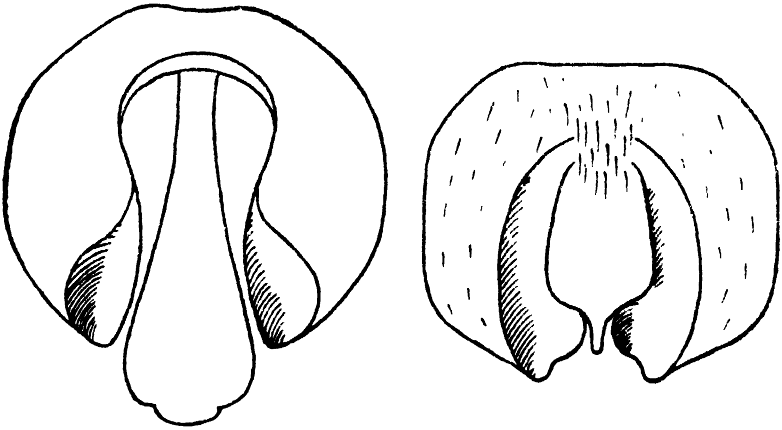

Fig. 3—*Thelcticopis karnyi* n. sp. Epigyne

Thelcticopis modesta Thor. Epigyne

Eighteen species of the genus *Thelcticopis* are known from the Indian, Malaysian and Papuan sub-regions. Of 4 species both male and female have been described, of 5 species only the male, and of 9 species only the female. The descriptions of *Th. luctuosa* (Dol.) and of *Th. moesta* (Dol.) are inadequate for the purpose of assigning a systematic position to those species. From the spination of the tibiæ we can group those 18 species into 5 series:

(1) Underside of tibia I externally 4, internally 5 spines: *Th. orichalcea* (Sim.), from Sumatra and Borneo, and *Th. herculea* Poc., from Ceylon.

(2) Underside of tibia I with 5 pairs of spines: *Th. canescens* Sim., from Burma, *Th. papuana* Sim., from New Guinea and Yule, *Th. celebesiana* Merian, from Celebes, *Th. rubristernis* Strand, from the Aru Islands, *Th. ajax* Poc., from Ceylon, and *Th. goramensis* (Thor.), from Goram.

(3) Underside of tibia I externally 5, internally 6 spines: *Th. modesta* (Thor.), from Penang and Burma.

(4) Underside of tibia I with 6 pairs of spines: *Th. flavipes* Poc., from Batjan, and *Th. convoluticola* Strand, from the Aru Islands.

(5) Underside of tibia I externally 7, internally 8 spines: *Th. serambiformis* Strand, from India.

Th. klossi belongs to the second series. *Th. canescens* is distinguished by the black longitudinal lines of its tibiæ and metatarsi, and *Th. rubristernis* by its blood-red sternum. *Th. ajax* has at the lower margin of the fang-groove not 5 to 6, but 7 to 8 teeth. *Th. papuana* shows on the upper side of the abdomen a peculiar design: a light median bar with a row of brown triangles in its posterior half, and on either side slanting zones of brown dots. Finally, *Th. klossi* differs from *Th. celebesiana* and *Th. goramensis* by the shape of its epigyne.

Th. karnyi belongs to the third series, and is from *Th. modesta* readily distinguished by the shape of the epigyne.

Parherus fasciatus Reimoser.

One ♀ Siberut.

Spariolenus ætniatus Thor.

Four ♀ ♀ Sipora; 5 ♀ ♀ Siberut.

Fam. **Lycosidæ**

Lycosa vagula (Thor.).

Seven ♀ ♀ Siberut.

Fam. **Oxyopidæ**

Oxyopes birmanicus (Thor.).

Seven ♂ ♂, 4 ♀ ♀ Sipora; 12 ♂ ♂, 42 ♀ ♀ Siberut.

***Tapponia incompta** Thor.

One ♀ Siberut.

Fam. **Ctenidæ**

Ctenus valvularis (Hass.).

Three ♀ ♀ Sipora; 1 ♂, 4 ♀ ♀ Siberut.

Acanthesis longiventris Sim.

Four ♀ ♀ Siberut.

Fam. **Salticidæ**

Linus subvexus (Thor.).

Three ♀ ♀ Sipora.

Bavia sexpunctata (Dol.).

Six ♀ ♀ Sipora; 4 ♀ ♀ Siberut.

Bavia smedleyi n. sp. (fig. 4).

♀. Cephalothorax 5 mm. in length, 3·5 mm. in width; abdomen 7·2 mm. in length, 3·2 mm. in width. The lower margin of the fang-groove bears 6 teeth. Tibia II has on its underside 3 external and 2 internal spines, and tibia III on the underside a pair of terminal spines and on either side 2 lateral spines.

Length of the joints of the legs:

	femur	*patella*	*tibia*	*metatarsus*	*tarsus*
I	2·8 mm.	1·8 mm.	2·3 mm.	1·5 mm.	1 mm.
II	2·7 ,,	1·7 ,,	1·7 ,,	1·3 ,,	0·9 ,,
III	2·5 ,,	1·2 ,,	1·5 ,,	1 ,,	0·8 ,,
IV	3 ,,	1·5 ,,	2·2 ,,	1·7 ,,	1·1 ,,

The cephalothorax is reddish brown. The ocular area is so filled up by 4 large black spots that only a narrow median bar remains of the ground colour, crossed by a narrow transverse streak. The thoracic portion is at the sides and behind narrowly bordered with brown. and for the rest densely covered with brown spots. Behind the ocular area runs a broad pale transverse band.

The mandibles are light orange, with an elongated brown mark at their base and are in front covered with a long, white, silky pubescence. The pedipalps are light orange, with the two end joints darker, and bear on either side at their base a brown spot. The sternum is orange, darker along the edges. The legs are orange; leg I is brown, tibia and metatarsus III and IV brown terminally. The abdomen is yellowish-white above, with two rows of large dark brown maculæ between them, leaving free a serrated longitudinal streak. Alongside either row of maculæ lie dense dark brown striæ and small spots. On the ventral side run two longitudinal brown bands which join in front of the spinnerets. Of this species one ♀ was taken on Siberut.

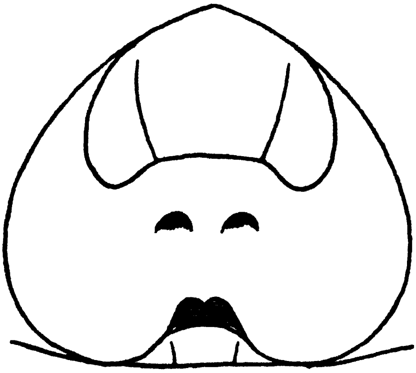

Fig. 4—*Bavia smedleyi* n. sp.
Epigyne

Seven species of the genus *Bavia* are known from the Indo-Chinese, Malaysian, Philippine and Papuan sub-regions. Of 4 species both male and female have been described, of 2 species only the female, and of 1 species only the male. In *B. papakula* Strand, from the Aru Islands, and in *B. annamita* Sim., from Annam, the abdomen is black in colour and has in the former species two longitudinal rows of white maculæ above, but is in the latter species either unicolorous (♂) above, or traversed by a yellow cross band (♀). The abdomen of the other species has always a light median streak. Tibia III of *B. hians* (Thor.) and *B. decorata* (Thor.), from Sumatra, is without spines. In the remaining 3 species and in *B. smedleyi* tibia III is spined. *B. thorelli* Sim., from Celebes, has only 3 teeth on the lower margin of the fang-groove of the mandibles; *B. smedleyi* has 6, *B. sexpunctata* Dol., from Sumatra, Java and the Moluccas, and *B. aericeps* Sim., from the Philippines, New Guinea, the Mariannes, Samoa and Hawaii, only 5 teeth. *B. smedleyi* differs from all these species also by the shape of the epigyne and by the peculiar markings of the cephalothorax.

Myrmarachne manducator (Westw.).
Two ♂ ♂ Sipora.

Myrmarachne maxillosa (C. L. Koch).
Two ♂ ♂ Sipora.

***Myrmarachne mandibularis** (Thor.).
Two ♂ ♂ Sipora.

Thiania demissa Thor.
Two ♂ ♂ Siberut.

Menemerus bivittatus (Duf.).
Six ♀ ♀ Sipora.

Hyllus pudicus Thor.
One ♂ , 2 ♀ ♀ Sipora.

Hyllus keratodes (Hass.).
Four ♂ ♂ Siberut.

Plexippus paykulli (Aud.).
Two ♀ ♀ Sipora; 4 ♀ ♀ Siberut.

***Pancorius nævius** Sim.
Two ♂ ♂ , 2 ♀ ♀ Siberut.

Pseudamycus albomaculatus (Hass.).
Three ♀ ♀ Siberut.

Viciria terebrifera (Thor.).
Two ♀ ♀ Sipora.

Donoessus nigriceps Sim.
One ♂ Sipora; 2 ♂ ♂ Siberut.

Fam. **Psechridæ**

Psechrus libeltii Kulcz.
Two ♀ ♀ Sipora.

Fecenia sumatrana Kulcz.
Two ♀ ♀ Siberut.

Fam. **Argiopidæ**

Nephila maculata (F.).
Twelve ♀ ♀ Sipora.

Nephilengys malabarensis (Walck.).
Four ♂ ♂, 25 ♀ ♀ Siberut.

Tetragnatha gracilis (Stol.).
One ♀ Siberut.

Leucauge decorata (Blackw.).
One ♀ Siberut.

Leucauge gemmea (Hass.).
One ♀ Siberut.

Leucauge fastigata Sim.
One ♀ Siberut.

Argiope versicolor (Dol.)
Seven ♀ ♀ Sipora.

***Gea festiva** Thor.
Four ♀ ♀ Siberut.

Cyclosa bifida (Dol.).
Two ♀ ♀ Sipora.

Aranea dehaani (Dol.).
Six ♀ ♀, 1 ♀ Siberut.

Aranea laglaizei (Sim.).
Eight ♀ ♀ Sipora.

Aranea oxyura (Thor.).
Two ♀ ♀ Sipora.

Gasteracantha arcuata (F.).
Three ♀ ♀ Siberut.

Gasteracantha clavatrix (Walck.).
Four ♀ ♀ Sipora.

Gasteracantha diardi (Luc.)
Six ♀ ♀ Sipora.

Spolia Mentawiensia

Opiliones

By C. Fr. Roewer

(Bremen).

Amongst a large number of *Araneæ* collected in the Mentawi Islands, off the West Coast of Sumatra, by Messrs. C. Boden Kloss, N. Smedley and H. H. Karny in 1924,[1] there were also a few Opiliones, which Mr. C. Boden Kloss, Director of Museums, Straits Settlements and Federated Malay States, entrusted to me for determination, and I thank him for having done so.

In working out the collection, in which I have found three new species, I have based the classification of the Opiliones upon my "Weberknechte der Erde" 1923,[2] in order to avoid a repetition of the diagnoses of known species, and I must refer to that publication for lists of literature and quotations. The collection includes the following Opiliones:—

Sub-order **LANIATORES** Thorell 1876.

Fam. **Phalangodidæ** Simon 1879

Sub-fam. PHALANGODINÆ Roewer 1912

1. **Beloniscus albimarginatus** Rwr.

Rœwer, Weberknechte der Erde, p. 75 (1923).

So far known from Singapore only. Several ♀ ♀ from Siberut.

2. **Beloniscus** (sp. ?).

The single specimen obtained is much mutilated and without legs, so that a determination is impossible.

Sub-fam. ACROBUNINÆ Roewer 1912

3. **Harpagonellus glaber** Rwr.

Rœwer, Abh. Nat. Ver. Bremen, Vol. XXVI, part 2, p. 329, fig. 29 (1927).

Several ♂ ♂ and ♀ ♀ from Sipora.

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[1] *Vide* Bull. Raffles Mus., No. 1, 1928, pp. 2—4.

[2] Die Weberknechte der Erde. Systematische Bearbeitung der bisher bekannten *Opiliones*. Pp. VI + 1116, 1212 figs. (G. Fischer, Jena), 1923.

Fam. **Assamiidæ** Sœrensen 1884

Sub-fam. DAMPRETINÆ Roewer 1912

4. **Simalurius jacobsoni** Rwr.

Rœwer, Weberknechte der Erde, p. 1093 (1923).
Several examples, Siberut.

Sub-order **PALPATORES** Thorell 1876

Fam. **Phalangiidæ** Simon 1879

Sub-fam. GAGRELLINÆ Rower 1912

5. **Dentobunus albiannulatus** n. sp.

Length of body 4 mm.; femur I—IV 10 mm., 27 mm., 11 mm., 21 mm.; leg I—IV 42 mm., 100 mm., 47 mm., 64 mm.

Surface of carapace, of scutum and of the free abdominal tergites uniformly and sparingly granular; tuber oculorum as long as broad and as high, in front, at the base and behind with fine and minute teeth, above on either side of the longitudinal furrow smooth and not armed, but at the upper front on either side with an obliquely projecting spine tht end of which is sharply bifid; scutum with two slender, smooth and pointed median spines (one each in area 1 and 2). Free abdominal sternites and surface of the four coxæ dull, smooth; tubercles of the marginal rows of the coxæ transversely truncated. Supra-cheliceral lamellæ with numerous teeth; first joint of the cheliceræ dorsally sparsely, but distinctly granular. Pedipalps slender and thin, entirely un-armed; patella without apophysis and as long as the tibia; the latter six times as long as thick; tarsus ventrally with traces of a longitudinal row of granules; (in one of the specimens the tibia of the left pedipalp is absent altogether, so that it abnormally has one joint less than the normally formed right pedipalp). Legs very long and slender; I—IV trochanter toothed on either side; I—IV femur toothed; number of noduli on I—IV femur 0, 1, 0, 0.

Body, cheliceræ and pedipalps uniformly pale rust-yellow, only the tuber oculorum dark brown. Legs darker rust-yellow, and I—IV tibia each with a broad, white terminal ring.

Siberut 1 ♂.

5. **Gagrellula siberutiana** n. sp.

Length of body 6 mm.; femur I—IV 16 mm., 32 mm., 13 mm., 18 mm.; leg I—IV 73 mm., 141 mm., 67 mm., 90 mm.

Surface of carapace, scutum and of the free abdominal tergites with widely-spaced coarse granules, as also the surface of coxa I—IV. Tuber oculorum in front higher than behind, slightly slanting backwards, around the base granular like the surface of the carapace; in front above with a few (2—4) minute granules, but entirely smooth on either side of the median longitudinal furrow.

Scutum only upon the second area with a slender median spine. Free abdominal sternites dull, smooth, laterally granular; tubercles of the marginal rows of the coxæ transversely truncated, first joint of the cheliceræ dorsally with a few granules. Pedipalps: femur ventrally with numerous stout teeth, patella without apophysis, dorsally and laterally toothed, tibia three times as long as thick, with teeth around; tarsus not armed, but in the male with a ventral longitudinal row of granules. Legs long and slender; femora toothed; number of nodules on femur I—IV: 0, 3, 0, 0.

Body dorsally, including tuber oculorum, black, only a median frontal mark of the carapace and the two supra-cheliceral lamellæ intensely golden-yellow. Free abdominal sternites and coxæ I—IV rusty-yellow, the latter thickly covered with a white secretion of the epidermal glands. Cheliceræ and pedipalps uniformly black to dark brown. Legs dark-brown, unicolorous.

Siberut: several male, female and immature specimens.

7. Paragagrella basalis n. sp.

♂. Length of body 6 mm.; femur I—IV 14 mm., 26 mm., 12 mm., 18 mm.; leg I—IV 57 mm., 129 mm., 51 mm., 76 mm.

♀. Length of body 7 mm.; femur I—IV 12 mm., 22 mm., 10 mm., 16 mm.; leg I—IV 50 mm., 110 mm., 45 mm., 67 mm.

Surface of carapace, of scutum, and of free abdominal tergites and sternites uniformly coarse granular. Tuber oculorum as high as long and broad, entirely unarmed and dull, smooth, but basally beneath the eyes on either side with one to two coarse teeth. Scutum only in the second area with a median spine which basally is coarse granular, and apically slightly turned back. Surface of coxa I—IV very coarsely granular, the tubercles of the marginal rows transversely truncated. First joint of the cheliceræ dorsally with 2—3 granules. Pedipalps: femur ventrally with numerous teeth, patella without apophysis, not armed in the male, and dull, smooth, in the female with rough teeth around, tibia four times as long as thick, in the male not armed and dull, smooth, in the female with teeth around, tarsus in the male ventrally in the basal two-thirds with a close longitudinal row of coarse granules, in the female entirely unarmed. Legs long and slender, femora toothed, number of noduli on femur I—IV · 0, 3, 0, 1.

Body dark brown, carapace and coxa I—IV thickly covered with a white secretion of the epidermal glands, scutum and free abdominal tergites and sternites only with scattered granules of the white epidermal secretion. (The scutum of young specimens which have not yet attained their full colour, shows a more or less distinct rust-yellow median saddle, with coxæ and free sternites of a lighter brown tint). Legs, pedipalps and cheliceræ uniformly dark brown.

Siberut: numerous male, female and immature specimens.

List of papers by the Staff of the Raffles Museum and by others concerning material in the Museum collections, 1923—1928

1923

CHASEN, F. N.—"On the Heel-Pad in certain Malaysian Birds" (Journal Malayan Branch, Royal Asiatic Society, I, pp. 237—246).

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(The Singapore Naturalist, No. 2, pp. 87—112).

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KARNY, Dr. H. H.—"On Malaysian Katydids *Gryllacridæ and Tettigonidæ* from the Raffles Museum, Singapore" (tom. cit. pp. 116—193).

KLEINE, R.—"New *Brenthidæ* from the Raffles Museum, with remarks on the Brenthid fauna of the Malay Peninsula" (tom. cit. pp. 271—281).

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LALLEMAND, V.—"Description de quelques nouveaux *Cercopidæ* de la faune Indo-malaise". (tom. cit. pp. 267—270).

MOULTON, J. C.—"Some Pierine Butterflies new to Malaysia". (tom. cit. pp. 233—236).

"New Generic Name for two Australian Finches". (Ibis., p. 782).

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"Notes on the Fauna of Pulau Bulan, Rhio Archipelago" (Journal Malayan Branch, Royal Asiatic Society, Vol. II, pp. 58—62).

(*a*) On the occurrence of certain alien birds in Singapore. (*b*) *Delichon urbica dasypus* in the Malay Peninsula. (*c*) The local status of *Oceanodroma m. monorhis* (tom. cit. p. 71).

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"The Malaysian Members of the Genus *Fregata*" (tom. cit. pp. 62—65).

"Some Birds of Christmas Island (Indian Ocean)" (tom. cit. pp. 65—68).

KLOSS, C. BODEN—"The Forms of *Criniger gularis* and *C. gutteralis*" (tom. cit. p. 71).

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"Description of a new Genus and two new species of Dragonflies (*Odonata*) belonging to the family *Gomphidæ* from Tropical Asia" (Proc. Zool. Soc. Lond., pp. 439—444).

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"Bird Notes. (*a*) On the capture of a second example of *Piprisoma squalidum sordidum* R. and K. (*b*) *Micropus pacificus cooki* (Harington) in the Malay Peninsula (*c*) *Setornis criniger* (tom. cit. part 1, pp. 102—103).

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By Malcolm A. Smith, F.Z.S.—

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The Reptilia and Amphibia of the Malay Peninsula from the Isthmus of Kra to Singapore

including the adjacent islands

(A Supplement to
Dr. G. A. Boulenger's Reptilia and Batrachia, 1912)

by

Malcolm A. Smith, F.Z.S.

INTRODUCTION

In the course of his studies of the Reptiles and Amphibians of the Indo-Chinese subregion it was obvious that there would come beneath the notice of Dr. Malcolm A. Smith much material and literature dealing with the adjacent Malay Peninsula, a Malaysian province with which he was already very familiar.

Since the volume by Dr. G. A. Boulenger on the Reptilia and Batrachia of the Malay Peninsula was published in 1912* collecting work has brought to light a good many new species and new records for that area and researches in nomenclature have caused the change of a great many names.

I therefore asked Dr. Smith if he would undertake to prepare a hand-list of Malayan reptiles and amphibians in terms of the most recently accepted nomenclature and include in it the forms inhabiting the Peninsula, south of the Isthmus of Kra, which were unknown, or unrecognised, at the time Dr Boulenger produced his work. Dr Smith agreed to do this.

It should be understood that the present publication is supplementary only to Dr. Boulenger's volume and not an independent work. It gives recent changes in nomenclature, discusses certain doubtful species and others which required revision; and includes all forms, new and otherwise, obtained in the Malay Peninsula subsequent to the earlier account which should be studied with it.

In his Preface Dr. Smith has commented on the curious discontinuous distribution of certain species. I, and probably others, have already elsewhere drawn attention to similar conditions in the ranges of a number of mammals and birds. These species, occurring in the Indo-Chinese subregion which includes the northern quarter of the Malay Peninsula (lat. 10° to 13° 30′ N.), and again in one or more of the great islands of Sumatra, Java and Borneo, have not been met with in that other well-explored part of the Malaysian subregion—the southern half of the Peninsula—though that is continuous with Indo-China. As far as birds are concerned we can rule out migration between the areas north and south of the equator: climatic changes are insufficient to cause it and species which are common, for instance, to Siam and Java are generally represented by different subspecies in these two countries. If the species in question were high-level ones we could explain their absence in the Malay States by noting that the mountains there are not high enough to offer a congenial habitat (as is the case with plants) but the animals concerned are not mountain species. It has been suggested that the species are not now present because they have died out: but this solution does not seem a very satisfactory one. An interesting problem offers itself to zoologists.

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*A Vertebrate Fauna of the Malay Peninsula from the Isthmus of Kra to Singapore including the adjacent islands: Reptilia and Batrachia; by George A Boulenger, D Sc., Ph D., F.R S. London: Taylor and Francis, 1912.

C. BODEN KLOSS,
Director of Museums,
Straits Settlements and
Federated Malay States.

RAFFLES MUSEUM,
SINGAPORE, STRAITS SETTLEMENTS.
January, 1930.

PREFACE

This supplement to Dr. G. A. Boulenger's Fauna of the Malay Peninsula (Reptilia and Batrachia) has been compiled at the suggestion of Mr. C. Boden Kloss, Director of Museums, Straits Settlements and Federated Malay States. It contains descriptions of all genera and species that have been discovered in the Peninsula since the publication of Boulenger's volume in 1912, together with references to all fresh information dealing with the region. The changes in nomenclature are included, and at the end is a bibliography of the recent literature upon the subject.

Altogether 1 species of turtle, 16 of lizards, 12 of snakes and 18 of amphibians have been added to the fauna in the last fifteen years. The total number of species, however, has not been augmented to that extent. Several have been suppressed while others have not been included as the evidence for their occurrence in the Peninsula is believed to be incorrect. The majority of the additions are from the northern part of the Peninsula, a region which was but little investigated prior to 1912. This country—from Lat. 6°. N., northwards to the Isthmus of Kra—is now probably as well-known herpetologically as the southern part, although it is likely that some of the Indo-Chinese forms that extend their range to just south of the Isthmus remain to be discovered. The expedition of Messrs. Robinson and Kloss to the northern part of the peninsula in 1919, the extensive collections made by Mr. C. J. Aagaard at Bangnara in Patani and the material obtained by myself or by my native collectors during my residence in Siam, are the chief sources of this additional knowledge.

An interesting problem in geographical distribution is connected with a number of species which are to be found in the northern part of the Peninsula and in the Malay Archipelago, but not in the southern part of the Peninsula. The reason for this discontinuous distribution has not been explained. It will be convenient here to record the names of these species.

CROCODILES

Crocodylus siamensis

CHELONIANS

Geoclemys subtrijuga

LIZARDS

Gonocephalus doriae, Draco taeniopterus, Tropidophorus (genus).

SNAKES

Thalassophina viperina, Thalassophis anomalus, Amblycephalus carinatus, Amblycephalus laevis, Agkistrodon rhodostoma.

AMPHIBIANS

Rana cancrivora, Rhacophorus colletti, Philautus bimaculatus, Philautus horridus, Bufo borbonica.

That sea snakes, which are not dependent upon geographical changes in the same way as terrestrial reptiles should be included is remarkable. The recent discovery of Russell's Viper by Dunn on the Island of Komodo and by Mertens on Flores is an instance of even more marked discontinuous distribution. On the Asiatic mainland this snake has not been met with south of Bangkok.

Among the problems that more especially require attention are the exact number of species of *Trionyx* among the Chelonians, of *Draco, Gonocephalus, Varanus* and *Lygosoma* among the lizards. and of *Oligodon, Gongylosoma* and *Amblycephalus* among the snakes.

The larval forms of many of the amphibians have been described in recent years, but we are still in almost complete ignorance of the life-histories of the tree-frogs (genera *Rhacophorus* and *Philautus*) and of the brevicipitid frogs of the genera *Kalophrynus* and *Phrynella*. The existence of a fresh-water crocodile also needs confirmation.

A new form of *Rana cancrivora* is proposed in this paper (p. 96).

MALCOLM SMITH.

LONDON,

November, 1929.

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CLASS REPTILIA

Order **EMYDOSAURIA**

Family **Crocodylidae**

Genus **Tomistoma**

Tomistoma schlegelii, Boulenger, p. 3.

Genus **Crocodylus**

The original spelling of Laurenti is retained.

Crocodylus porosus.

Crocodilus porosus, Boulenger, p. 4.

Crocodylus siamensis.

Crocodilus palustris, Boulenger, p. 5; Laidlaw, P. Z. S., 1901, p. 581; Annandale and Robinson, Fascic. Malay. Zool., 1904. p. 148.

The fresh-water crocodile of the Malay Peninsula—as distinct from *C. porosus* which is marine or estuarine in its habits—is *Crocodylus siamensis.* I am only aware of one authentic specimen in existence and that is the one obtained by the Skeat expedition at Biserat, Jalor, Patani, and now in the University Museum of Zoology at Cambridge. Through the kindness of the Superintendent it has recently been forwarded to me for examination. It is a juvenile, 1 metre 375 mm. in length and is an undoubted example of the Siamese Crocodile. It can be distinguished at once from its Indian ally, *C. palustris*, by having only four teeth in the premaxillary bone instead of five, by the premaxillo-maxillary suture on the palate being curved backwards instead of passing straight across the jaw, and by the longer and narrower snout.

It is most probable that the *C. palustris* recorded from Java is also *C. siamensis*. The distribution of the two species will then more closely accord with our knowledge of geographical distribution, *C. palustris* being confined to the Indian region, *C. siamensis* to Siam, French Indo-China, the northern part of the Malay Peninsula and Java.

Order **TESTUDINATA**

Chelonia, p. 6.

Family **Trionychidae**

KEY TO THE GENERA

1. Orbit nearer the temporal than the nasal fossa; postorbital arch narrower than the orbit; bony choanae between the orbits; proboscis long.
    - *a*. Last pair of costal plates in contact on the median line; median processes of hypoplastron present; head moderate ... *Trionyx*.
    - *b*. All the costal plates separated by the neural plates; median processes of hypoplastron absent; head very large ... ... *Dogania*.
2. Orbit nearer the nasal than the temporal fossa; postorbital arch broad; proboscis very short ... ... *Pelochelys*.
3. Orbit much nearer the nasal than the temporal fossa; postorbital arch very broad; proboscis moderate ... ... *Chitra*.

Genus **Trionyx**

Trionyx (part), p. 8.

Trionyx, Siebenrock, SB. Akad. Wiss. Wien, Vol. 116, p. 1764 (1909).

Amyda, Stejneger, Science (n.s.) XXI, p. 228 (1905) and Herpet. Japan. p. 514 (1907).

T. subplanus is placed in a genus by itself.

Major Stanley Flower has pointed out to me that Geoffroy, in erecting his genus *Trionyx* (Ann. Mus. Hist. Nat. Paris, XIV, (1809) clearly intended *Trionyx aegyptiacus* (=*T. triunguis* Forskal) to be the type. On page 20 of his article he states "Le trionyx d'Egypte (*T. Aegyptiacus*), representé planche I, nous donnons une idée exacte du port et des caractères generiques des trionyx, nous nous sommes bornés, dans les planches suivantes, a faire figurer les seules parties caracteristiques des autres especes, telle que leurs carapaces et leur plastrons." Nothing could be more definite than this, and the use of the name *Trionyx* for the genus which contains the majority of the soft-shelled turtles is therefore correct.

Trionyx hurum.

Boulenger, p. 9; Robinson and Kloss, J. F. M. S. Mus., V, p. 154 (1915).

Boulenger recorded this turtle from the Malay Peninsula with doubt. Robinson and Kloss (1915) have since recorded it from Bandon, their identification being made on a head only.

Trionyx phayrii, Boulenger, p. 10.

Trionyx cartilagineus, Boulenger, p. 11

Genus **Dogania**

Trionyx (part), p. 9.

Dogania Gray, Cat. Tort. Brit. Mus., 1844, p. 49; Baur, Proc. Amer. Philos. Soc., 1893, XXXI, p. 220; Stejneger, Science, 1905, XXI, p. 229; Siebenrock. Zool. Jahr. Suppl. 1909, X, p. 605.

Orbits nearer the temporal than the nasal fossae; postorbital arch narrow, forming a keel exteriorly; bony choanae between the orbits. Eight neural plates separating the eight pairs of costal plates. Plastral callosities absent or feebly developed; no median continuation of the hypoplastron. One species.

Dogania subplana.

Trionyx subplanus, Boulenger, p. 9.

Genus **Pelochelys**

Pelochelys bibroni.

Pelochelys cantoris, Boulenger, p. 11.

Trionyx (*Gymnopus*) *Bibroni* Owen. Cat. Osteol. ser. R. Coll. Surg., I. 1853, p. 185.

After comparing Gray's type of *Pelochelys cantorii* (a half-grown, stuffed specimen and the skull which has been extracted from it) with Owen's type of *Trionyx bibroni* (the skull and bony carapace of a somewhat larger individual) I have no hesitation in uniting the two. Owen's name therefore has priority.

The statement that specimens of this turtle are in the local museums from the coasts of Perak and Selangor is not correct. Nor as far as my experience goes is it marine in its habits. It is not uncommon in Siam in the Chao Phya and the Ratburi rivers, where its flesh is esteemed by the natives and is said to be superior to that of *Trionyx cartilagineus*. All the specimens that I have seen were caught well above tidal limits, and I have satisfied myself after careful enquiry that it is not found at the mouths of these rivers or in the Gulf of Siam.

Genus **Chitra**

Chitra **Gray, Cat. Tort., p. 49 (1844); Boulenger, Fauna Brit. Ind.,** p. 16 (1890), Siebenrock, Zool. Jahrb. Suppl., 1909, p. 608.

Neural plates well developed; a single neural between the first pair of costals; a median process upon the hypoplastron. Bony choanae behind the orbits, which are situated at the anterior extremity of the skull; postorbital arch at least twice as broad as the diameter of the orbit.

A single species.

Chitra indica.

Chitra indica Gray, Cat. Tort., p. 49 (1844); Boulenger, Cat. Chelon. Brit. Mus., p. 264, 1889, fig. (skull); and Fauna Brit. Ind., p. 16 (1890); Annandale, Rec. Ind. Mus., VII, 1912, p. 169, fig. (skull and branchial skeleton); M. A. Smith, Journ. F. M. S. Mus., X, 1922, p. 264.

Eight pairs of costal plates, the last well developed and forming a median suture; a single neural between the first pair of costals; plates coarsely pitted and vermiculate. Entoplastron forming an acute angle; epiplastra short, widely separated; four plastral callosities, well developed. Head small, snout extremely short; interorbital space considerably narrower than the greatest diameter of the orbit.

Colour. Olive or pale greenish above, whitish below; the dorsal disc with numerous pale broad lines and angular markings, which are often edged with black. Head and neck above with longitudinal light, dark-edged streaks.

The specimen obtained in the Tahan river, Pahang, by the F. M. S. Museums, and two more obtained by me at Kanburi, Ratburi river, peninsular Siam are coloured as above. In the absence of any adult examples from India to compare them with I am unable to say if any difference exists, but it would appear that the adult turtle in India lacks the quaint angular markings upon the disc which characterize the peninsular form. Gray's figure of a juvenile (Illus. Ind. Zool., 1, pl. LXXX, 1832, and Günther's plate of a young specimen (Rept. Brit. India) shew somewhat similar markings, but Dr. Annandale once told me that none of the adult specimens of *Chitra indica* that he had examined had any pattern at all upon the disc.

Family **Testudinidae**

No new species have been added since the publication of Boulenger's volume and it is unlikely that any more will be discovered in the Malay Peninsula. Several changes in generic titles are to be noted. As pointed out by Stejneger the names *Geoemyda* and *Damonia* are inapplicable and they are now replaced by *Heosemys* and *Geoclemys* respectively. The monotypic genus *Notochelys* has been revived by Siebenrock for the species called by Boulenger *Cyclemys platynota* and, as pointed out by me in 1917, *Cyclemys annandalei* in having the plastron immovably fixed to the carapace by suture and in having an incomplete bony temporal arch, is nearer to *Heosemys* (= *Geoemyda*) than to *Cyclemys*. The genus *Hieremys* is proposed for it.

KEY TO THE GENERA

I. Limbs club-shaped; alveolar surface of upper jaw with a median ridge; a bony temporal arch ... ... *Testudo*.

II. Digits distinct, with at least a rudiment of web; alveolar surface of upper jaw without median ridge.

A. Plastron united to carapace by suture, immovable.

No bony temporal arch; alveolar surfaces of jaws narrow; choanae on a level with the front of the eyes; margin of jaws smooth or feebly dentate ... ... *Heosemys.*

Bony temporal arch incomplete posteriorly; alveolar surfaces of jaws broad; choanae on a level with the middle of the eyes; margin of jaws strongly denticulate ... *Hieremys.*

A bony temporal arch; alveolar surfaces of jaws moderately broad; choanae on a level with the front of the eyes ... *Bellia.*

A bony temporal arch; alveolar surfaces of jaws very broad; choanae behind the level of the eyes ... ... *Geoclemys.*

B. Plastron connected to carapace by ligamentous suture; a bony temporal arch.

Five vertebral shields; skin of head undivided *Cyclemys*

Six or seven vertebral shields; skin of posterior part of head divided ... *Notochelys.*

III. Digits distinct, entirely webbed; alveolar surface of upper jaw with one or two median ridges.

A. Fore-limb with five claws.

Edge of jaws not denticulated; skin of hinder part of head divided into small shields ... *Orlitia.*

Edge of jaws denticulated; skin of hinder part of head undivided ... ... *Callagur.*

B. Fore-limb with four claws ... *Batagur.*

Genus **Testudo**

KEY TO THE SPECIES

Supracaudal shield single, more or less incurved ... ... *elongata.*

Two supracaudal shields embracing a deep notch.

Pectoral shields in contact with one another; carapace brownish or yellowish, head in the adult yellowish ... ... *impressa.*

Pectoral shields widely separated; carapace blackish or dark brown, head in the adult blackish ... ... *emys.*

Testudo elongata, Boulenger, p. 3.

Testudo impressa.

Geoemyda impressa, Gunther, P.Z.S., 1882, p. 343, figs. 1—3.
Testudo impressa, M. A. Smith, Journ. N.H.S. Siam, IV, 1922, p. 204 and Journ. F. M. S. Mus., X, 1922, p. 264.
Testudo latinuchalis, Boulenger, p. 15.

A full synonymy of this species has been given by me in the Journal of the Natural History of Siam.

The character of the vertebral shields as given by Boulenger to distinguish this species from *T. emys* is not always reliable. The following will serve to distinguish the two:—

T. emys	*T. impressa*
Basi-sphenoid with a well marked ridge on its inferior surface.	Basi-sphenoid without ridge.
Median ridge on alveolar surface of upper jaw strongly developed.	Median ridge feebly developed.
Pectoral shields usually widely separated from one another.	Pectoral shields in contact with one another.
Shell yellowish or pale brown, dark brown or black at the margins of the shields.	Shell dark brown or blackish.
Head of the adult yellow.	Head of the adult blackish.
Length of shell in a straight line 270 mm.	Length of shell 520 mm.

A specimen of *T. impressa* was obtained on Fraser's Hill in 1922.

Testudo emys, Boulenger, p. 15.

Genus **Heosemys**

Geoemyda, p. 16.

Heosemys, Stejneger, P. Biol. Soc. Washington, 15, p. 238 (1902); Siebenrock, Zool. Jahrb. Supp. 10, p. 506 (1909).

As shewn by Stejneger (1902), *Testudo spengleri* is type of the genus *Geoemyda* and that name cannot therefore be used for the genus which includes *spinosa* and *grandis*.

Heosemys spinosa.

Geoemyda spinosa, Boulenger, p. 17.

The species has been found in the Nakon Sritamarat mountains, Peninsular Siam. Miss Cochran (Bull. U. S. Nat. Mus., in press) records two specimens collected in Peninsular Siam at Ronpibun and Pran respectively. They are the most northerly authentic records for the species.

Heosemys grandis.

Geoemyda grandis, Boulenger, p. 17.

I have seen specimens from Bangnara, Patani, and from the neighbourhood of Chumporn.

Genus **Hieremys**

Cyclemys (part), p. 18.

M. A. Smith, Journ. N. H. S. Siam, II, 1916, p. 50.

Skull with an incomplete bony temporal arch. Alveolar surface of jaws very broad, completely covering in the posterior nares inferiorly; horny margin of jaw strongly dentate. Plastron united to carapace by suture. Digits with a broad web.

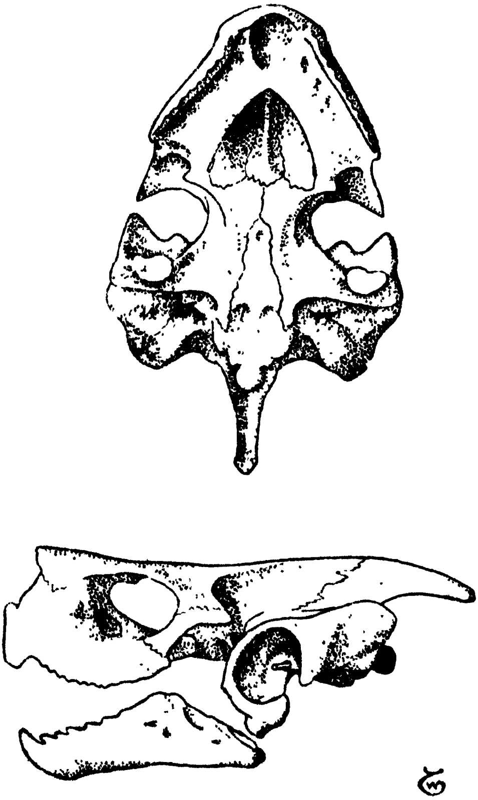

Fig. 1. Skull of *Hieremys annandalei.*

Hieremys annandalii.

Cyclemys annandalii, Boulenger, p. 19.

Hieremys annandalei, M. A. Smith, Journ. N.H.S. Siam, II, 1916, p. 50.

Range. Siam (Patani and neighbourhood of Bangkok); Cochin-China.

Genus **Siebenrockiella**
Btllia, p. 22.

Bellia (not of Milne Edwards, 1848), Gray, P.Z.S., 1869, p. 197.

Siebenrockiella Lindholm, Zool. Anz. Leipzig, Bd. 81 (11/12), 1929, p. 280.

Siebenrockiella crassicollis.

Bellia crassicollis, Boulenger, p. 23.

Genus **Geoclemys**
Damonia, p. 23.

Geoclemys (part), Gray, Cat. Shield Rept.. I, p. 17 (1855); Stejneger, Herpet. Japan, p. 496, 1907; Siebenrock, Zool. Jahrb., supp. 10, p. 476 (1909).

As shown by Stejneger (1907) *Geoclemys* is the correct name for the genus.

Geoclemys subtrijuga.

Damonia subtrijuga, Boulenger, p. 23.

Genus **Cyclemys**
Cyclemys (part), p. 18.

KEY TO THE SPECIES

Plastron notched posteriorly; posterior margin of carapace serrated	*dentata.*
Plastron not notched posteriorly; posterior margin of carapace not serrated	*amboinensis.*

Cyclemys dentata.

Emys dentata (part.) Gray, Syn. Rept., 1831. *errata*, correction of *dhor* on page 20.

Cyclemys dhor, Boulenger, p. 20.

The name *dhor* has no standing. It was changed to *dentata* by Gray himself in the original publication, the correction appearing in the *errata* at the end of the Synopsis. As first described *dentata* included also *Kachuga lineata*, the juvenile of the former and the adult of the latter being considered identical. No type of *dentata* is mentioned but the juvenile referred to by Gray on p. 21 as having been presented to him by Mr. Bell is in the British Museum of Natural History, and should be regarded as the type specimen.

Cyclemys amboinensis, Boulenger, p. 21.

Genus **Notochelys**

Cyclemys (part), p. 18.

Notochelys, *Gray*, P.Z.S., 1863, p. 177; Siebenrock, Zool. Jahrb., Supp. 10, p. 504 (1909).

Skin of the posterior part of the head covered with small shields; skull with a bony temporal arch; alveolar surface of jaws without median ridge. Plastron united to the carapace by ligament, with a more or less distinct hinge between the hyo- and hypoplastral bones. Six or seven vertebral shields.

Notochelys platynota.

Cyclemys platynota, Boulenger, p. 18.

Genus **Orlitia**

Orlitia borneensis, Boulenger, p. 24.

Genus **Callagur**

Callagur borneoensis.

Emys borneoensis Schleg. and Müll., Vert. Nat. Nederl. Ind. Rept., 1844, p. 30.
Tetraonyx affinis Cantor, Cat. Malay. Rept., 1847, p. 6 (in part).
Batagur affinis, Gunther, Rept. Brit. Ind., 1864, p. 40, pl. 3.
Batagur picta Gray, P.Z.S., 1862, p. 204.
Callagur picta, Boulenger, p. 25.

Cantor described his *Tetraonyx affinis* from three juveniles caught at Penang, all of which are in the collection of the British Museum of Natural History. Two of them are specimens of *Batagur baska*, which was described by Gray in 1830; the remaining one is the species now generally known as *Callagur picta* Gray, but which was not described under that name until 1862.

Genus **Batagur**

Batagur baska, Boulenger, p. 26.

Family **Cheloniidae**

KEY TO THE GENERA

Costal shields 4 pairs.
  Dorsal shields juxtaposed; one pair of prefrontal shields; upper jaw not hooked *Chelonia.*
  Dorsal shields strongly imbricate; two pairs of prefrontal shields; upper jaw hooked ... ... *Eretmochelys.*
Costal shields, 5 pairs or more ... ... *Caretta.*

Genus **Chelonia**

Chelone (part), p. 27.

Chelonia, Brongniart, Bull. Soc. Philom. Paris II, p. 89.

Chelonia mydas.

Chelone mydas, Boulenger, p. 27.

Chelonia japonica, Stejneger, Herpet. Japan, p. 509 (1907).

Genus **Eretmochelys**

Chelone (part), p. 28.

Eretmochelys, Fitzinger, Syst. Rept., p. 30 (1843).

Eretmochelys imbricata.

Chelone imbricata, Boulenger, p. 28.

Eretmochelys squamosa, Stejneger, Herpet. Japan, p. 511 (1907) and Proc. U. S. Nat. Mus., Vol. 38, p. 114 (1910).

Genus **Caretta**

Thalassochelys, p. 29.

Caretta Rafinesque, Spec. Sc. Palermo, II, p. 66 (1814); Stejneger, Proc. U. S. Nat. Mus., p. 714 (1902); Siebenrock, Zool. Jahrb., Supp. 10, p. 548 (1909).

Caretta caretta.

Thalassochelys caretta, Boulenger, p. 29.

Caretta caretta, Siebenrock, Zool. Jahrb. Supp. 10, p. 549 (1909).

Caretta olivacea, Garman, Bull. U. S. Mus., No. 25, 1884, p. 294; Stejneger, Herpet. Japan, p. 507 (1907) and Proc. U. S. Nat. Mus., Vol. 38, p. 114 (1910).

Family **Dermochelyidae**

Sphargidae, Boulenger, p. 30.

Dermochelyidae, Siebenrock, Zool. Jahrb. Supp. 10, p. 551 (1909).

Genus **Dermochelys**

Dermochelys coriacea.

Dermochelys coriacea, Boulenger, p. 30; Siebenrock, Zool. Jahrb., Supp. 10, p. 553 (1909).

Dermochelys schlegelii, Stejneger, Herpet. Japan, p. 485 (1907).

Order **SQUAMATA**

Sub-order SAURIA

LACERTILIA, p. 31.

Family **Gekkonidae**

A new genus, *Phyllodactylus* is added. *Hemidactylus platyurus* is transferred to the genus *Cosymbotus*, in which genus *Mimetozoon craspedotus* is also placed.

KEY TO THE GENERA

I. Digits not dilated, all clawed.

Pupil vertical; claw between two scales ... *Gymnodactylus.*

Pupil round; claw between two scales ... *Gonatodes.*

Pupil vertical; claw between three scales ... *Aeluroscalabotes.*

II. Digits dilated at the apex only; furnished inferiorly with two plates separated by a longitudinal groove *Phyllodactylus.*

III. Digits entirely dilated; the terminal joint compressed and rising from within the extremity of the expansion.

A. Inner digit clawed.

Digits free or webbed at the base; no cutaneous expansion along the side of the body ... *Hemidactylus*

Digits half to fully webbed; a cutaneous expansion along the side of the body ... ... *Cosymbotus.*

B. Inner digit clawless ... ... *Peropus.*

IV. Digits entirely dilated; the terminal joint compressed and rising from the extremity of the expansion.

Digits free or webbed at the base; sub-digital lamellae paired ... ... *Lepidodactylus.*

Digits free or webbed at the base; sub-digital lamellae single ... ... *Gekko.*

Digits extensively webbed; sub-digital lamellae single; a cutaneous expansion along the side of the body ... ... *Ptychozoon.*

Genus **Gymnodactylus**

Three species are added; the amended key will read as follows:

I. Lower surface of tail covered with small scales

- Male with preanal and femoral pores, back brown with dark grey spots which may be confluent into cross bars ... ... *marmoratus.*
- Male with preanal pores only; back brown with a double series of from 6 to 8 large rounded spots and smaller ones outside ... *peguensis.*
- Male with preanal pores only; back dark brown with irregular small white spots ... ... *sworderi.*

II. Lower surface of tail with enlarged scales or transverse plates.

- Male with a pubic groove containing pores; femoral pores present; back with dark cross bars ... *pulchellus.*
- Male without pubic groove, with preanal pores only; back with dark cross bars ... ... *consobrinus.*
- Male with 2 or 4 preanal pores, sometimes absent; back with dark longitudinal streaks ... ... *oldhami.*
- Male with preanal and femoral pores; digits webbed at the base; back brown uniform or with small black spots ... ... *brevipalmatus.*

Gymnodactylus marmoratus.

Boulenger, p. 35; Sworder, S'pore. Naturalist, No. 5, 1925, p. 63 (Singapore).

Sworder records a specimen caught in the Botanic Gardens, Singapore.

Gymnodactylus peguensis, Boulenger, p. 36.

Gymnodactylus sworderi.

M. A. Smith, Journ. Malay. Br. Roy. Asiat. Soc., III, 1925, p. 87.

Ear opening oval, oblique, its length equal to one-third the diameter of the eye; rostral large, quadrangular, broader than long; nostril between the rostral, the first supralabial, a supranasal and five small granular scales; 14 upper and 10 lower labials;

mental large, sub-triangular, with a pair of large chin-shields in contact with each other behind it.

Head covered above with small granules, largest upon the snout; occiput with small granules and larger rounded tubercles; back covered with small granules and larger rounded, subtrihedral tubercles; a feeble fold along the flank from the axilla to the groin; ventral scales small, imbricate, about 42 across the middle of the belly between the lateral folds; two series of three preanal pores each, slightly diverging from each other, and a series of 10 or 11 enlarged femoral scales, pitted but not perforated, extending outwards from the preanal scales.

Limbs moderate, digits rather short, the plates beneath the basal phalanx roundish, convex, about half the width of the digit; the forelimb pressed backwards extends two-thirds the distance between the axilla and the groin; the hindlimb reaches to the axilla; tail (regenerated) covered with small scales.

Dark brown above, with smallish, irregularly-shaped white spots; these extend along either side of the head leaving the remainder of the upper part of the head uniform in colour; lower parts yellowish-white.

Length of head and body 77; tail (regen.) 58, forelimb 26; hindlimb 35 mm.

Gymnodactylus sworderi is most nearly related to *G. peguensis* Boulenger, from lower Burma and Siam. It differs slightly in the arrangement of the preanal pores and in the number of supralabials and, very markedly, in coloration.

The type and only known specimen was collected 9 miles north of Kota Tinggi, Johore, by Mr. Hope Sworder.

Gymnodactylus pulchellus, Boulenger, p. 36.

Gymnodactylus consobrinus, Boulenger, p. 37.

Gymnodactylus oldhami.

Gymnodactylus oldhami Theobald, Cat. Rept. Brit. Ind., p. 81, 1876; Boulenger, Fauna Brit. Ind., p. 67 (1890); Annandale, Rec. Ind. Mus., p. 320, 1913, pl. XVII, fig. 2; M. A. Smith, Journ. N.H.S. Siam, II, 1916, p. 150 (P. Siam).

Head moderate, oviform, depressed; snout rounded, as long as or a little longer than the distance between the eye and the ear-opening; ear opening suboval one-third the diameter of the eye; forehead concave. Rostral quadrangular, with median cleft above. Nostril bordered by the rostral, an internasal, the first labial and several small scales; 12 or 13 supralabials and 10 or 11 infralabials; mental triangular; first pair of chin-shields large and in contact with one another behind the mental, and succeeded by one or two more pairs widely separated from one another.

Head covered with granules, largest on the snout and interspersed with small rounded tubercules on the occiput; back covered with small granules intermixed with about 20, more or less regular, longitudinal rows of enlarged, rounded subtrihedral tubercles. Throat covered with small granules; belly with cycloid, imbricate scales, about 40 across the middle; an indistinct lateral fold may be present.

Tail cylindrical with whorls of small scales above and larger scales below, those of the median rows being considerably bigger than the others.

Limbs moderate; digits rather short, with enlarged transverse plates inferiorly.

Male with enlarged preanal and femoral scales; preanal pores present or absent, when present in one or two pairs interrupted by an unpierced scale.

Lightish brown above with a dark brown horse-shoe shaped mark on the nape, passing from eye to eye and bordered in front and behind with white; four longitudinal series of whitish spots down the back, usually confluent on the shoulders. Below yellowish-brown; tail alternately banded with light and dark brown.

Length of head and body 67 mm.; tail 70 mm.

Robinson and Kloss obtained this gecko at Tasan (Isthmus of Kra). It has been found also at Maprit, just north of the isthmus and in the district of Tavoy. As pointed out by Annandale (1913) there is no evidence that it occurs in southern India.

Gymnodactylus brevipalmatus.

M. A. Smith, Journ. N.H.S. Siam, VI, p. 48, 1923, plate 5. fig. 1.

Head moderate, depressed, snout a little longer than the orbit; ear-opening small, oval, one-sixth the diameter of the eye. Head above covered with small granules, which are larger over the snout and have small tubercles intermixed with them on the occiput. Rostral quadrangular, broader than high, bordering the nostril anteriorly, and bearing a median ⅄-shaped impression; two enlarged scales above it, also bordering the nostril; 12 or 13 upper labials, the first touching the nostril; 10 or 11 lower labials; mental large, triangular; first pair of chin-shields large and in contact with each other, followed by two pairs of smaller scales; throat covered with small, flat, granular scales. Back with small granules, interspersed with enlarged, rounded, keeled tubercles; a more or less distinct lateral fold of enlarged scales; ventral scales small, cycloid, about 35 to 45 across the belly between the lateral folds.

Tail cylindrical, tapering, covered above with small scales and regularly disposed rows of keeled tubercles, below with irregularly disposed, enlarged flat scales.

Limbs moderate, digits long, the toes webbed at the base; strongly compressed distally, the basal part much broader with 6 or 7 imbricate, transverse plates below.

Brown above, with obscure darker mottlings or small black spots; paler below.

Length. ♂ head and body 64 mm., tail 77 mm.; ♀ head and body 72 mm., tail (incompl.).

Male with 9 preanal pores in a wide angled series and 6 or 7 femoral pores the series separated from one another by an interval; enlarged scales in front and behind the preanal pores; no pubic groove.

Originally collected on Khao Luang (750 metres altitude), Nakon Sritamarat mountains, by Mr. H. M. Pendlebury, the species has since been found in northern Siam and in the Kamchay mountains, southern Cambodia.

Genus **Gonatodes**

I now regard the gecko recorded by me from Peninsular Siam (Journ. N.H.S. Siam, II, 1916, p. 151) under the name of *G. kendalli* as a distinct species, *G. siamensis*. The key to the three forms found in the Malay Peninsula will read as follows:—

I. Base of raised portion of digits with transverse plates beneath; tail with a median series of enlarged scales below—

A strong canthal ridge; tail with a median row of pointed semi-erect scales below; male without pores; length from snout to vent 80 mm. ... ... *kendalli*.

Canthal ridge indistinct or absent; tail with a median series of enlarged, pointed, not erect, scales below; male with from 2 to 8 preanal pores, sometimes absent; length from snout to vent 42 mm. ... ... *siamensis*.

II. Base of raised portion of digits with irregular, small scales; tail with small, keeled scales below.

Male with from 3 to 8 preanal pores ... ... *affinis*.

Gonatodes kendalli.

Gonatodes kendalli, Boulenger, p. 38; M. A. Smith, Journ. Sarawak Mus., III, 1925, p. 23.

Range. Malay Peninsula (Bukit Timah, Singapore); Pulau Tioman; Pulau Siantan, Anambas; Great Natunas; Borneo (State of Sarawak).

Gonatodes siamensis.

Gonatodes siamensis, M. A. Smith, Journ. Sarawak Mus., III, 1925, p. 21.

Gonatodes kendalli, (non Boulenger), M. A. Smith, Journ. N.H.S. Siam, II, 1916, p. 151.

Habit slender. Snout broad and rounded, depressed, longer than the distance between the eye and the ear-opening. Ear-opening vertically oval, not more than half the diameter of the orbit. Rostral large, quadrangular, broader than high with deep median cleft; nostril in contact with the rostral, an internasal and small scales behind; 9 to 11 upper, and 8 to 10 lower, labials; mental large, subtriangular; a pair of chin-shields separated from one another by a scale.

Head covered with granules, smallest on the occiput; no marked canthal ridge; back and sides of body covered with a mixture of small granules and large, keeled tubercles, the tubercles arranged in more or less regular rows; belly covered with small, imbricate scales; throat with small granules. Tail with small scales and whorls of pointed tubercles above and on the sides, below with large, pointed, flat scales, the median series being larger than the others. Male with from 2 to 8 preanal pores, sometimes absent altogether.

Limbs long and slender; digits long and slender, with small lamellae inferiorly and a large rounded plate at the articulation of the basal and proximal phalanx.

Total length 95 mm.; head and body 42 mm.

Brownish-green above, mottled and speckled with lighter and darker shades; below light-brownish.

Type locality Maprit, Patiyu, 60 kilometres north of the Isthmus of Kra. The species has also been met with in the Nakon Sritamarat mountains, and at Puket, Krabi and Tasan in the northern part of the Malay Peninsula. Also in south Tenasserim and in the mountains near Chantabun in S. E. Siam.

Gonatodes affinis.

Gonatodes affinis, Boulenger, p. 38; M. A. Smith, Journ. Sarawak Mus., III, 1925, p. 23.

Gonatodes kendalli, (non Boulenger), M. A. Smith, Journ. F. M. S. Mus., X, 1922, p. 268.

Range. Penang and the Perak Hills; Fraser's Hill, Pahang; Batu Caves, Selangor; Bukit Besar, Patani.

Genus **Aeluroscalabotes**

Aeluroscalabotes felinus.

Boulenger, p. 39; Sworder, S'pore. Nat., No. 5, 1925, p. 64.

I have recently obtained a specimen of this remarkable gecko from Benang Star, Patani. Sworder (1925) records four specimens captured in the Botanic Gardens, Singapore.

After examining the specimens of this lizard in the British Museum, I strongly doubt if *A. dorsalis* Peters, 1872, and *A. longicaudatus* Andersson, 1924, should be regarded as distinct. The characters upon which they are based seem to be varietal, rather than specific.

Genus **Hemidactylus**

Hemidactylus platyurus is placed in the genus *Cosymbotus*.

Hemidactylus frenatus, Boulenger, p. 41.

Hemidactylus brookii, Boulenger, p. 42.

Hemidactylus depressus, Boulenger, p. 43.

Hemidactylus leschenaultii, Boulenger, p. 43.

Hemidactylus flaviviridis, Boulenger, p. 44.

Hemidactylus garnoti., Boulenger, p. 44.

Genus **Peropus**

Gehyra, p. 46.

Peropus, Wiegmann, Nova Acta. Leop. Carol., XVII, 1835, p. 238; Stejneger, Herpet. Japan, p. 180 (1907).

The name *Gehyra*, used by Boulenger for this genus, was instituted by Gray in P.Z.S., 1834, p. 100, and not in Zoological Miscellanies, 1842, as generally stated. The only species mentioned at the time and therefore its genotype was *pacifica*, a gecko now placed under *Hoplodactylus* Fitzinger. *Gehyra* therefore has priority over *Hoplodactylus* which did not appear until 1843; it cannot be used for the species now under consideration.

Peropus mutilatus.

Gehyra mutilata, Boulenger, p. 47.

Peropus butleri.

Gehyra butleri, Boulenger, p. 47

A specimen was obtained by the F. M. S. Museums on Cameron's Highlands at an altitude of 1,000 metres in 1923.

Peropus larutensis.

Gehyra larutensis Boulenger, p. 48.

A female was obtained by the F. M. S. Museums at 4th Camp (alt. 1,800 metres) in the Cameron's Highlands in 1923; there is also a male specimen in the Raffles Museum from Gunong Kledang, Perak (alt. 800 metres).

Genus **Lepidodactylus**

Lepidodactylus ceylonensis., Boulenger, p. 49.

Lepidodactylus lugubris., Boulenger, p. 49.

Genus **Gekko**

Gecko, p. 50.

The original spelling of Laurenti is preserved.

Gekko gecko.

Gecko verticillatus, Boulenger, p. 50; Sworder, S'pore. Nat., No. 5, 1925, p. 64

Lacerta gecko Linn., Syst. Nat., 1758, p. 250.

Lacerta gecko dates back to Linnaeus, and although the species he referred to is not quite clear it has generally been considered identical with the one named *verticillatus* by Laurenti in 1768. *See* also Andersson in Bihang Svenska Vet-Akad. Band 26, Afd. IV, p. 13 (1900).

Gekko stentor.

Gecko stentor, Boulenger, p. 51.

Patani marks the northern range of this species.

Gekko monarchus.

Gecko monarchus, Boulenger, p. 51.

Genus **Cosymbotus**

Hemidactylus (part), p. 40.
Mimetozoon, p. 45.

Cosymbotus Fitzinger, Syst. Rept., p. 104 (1843).

Digits extensively webbed; sub-digital lamellae in two rows; terminal phalanges compressed and slender, rising from within the extremity of the dilated portion. A cutaneous expansion along the side of the body and tail. Dorsal lepidosis uniform or heterogeneous; pupil vertical; males with preanal and femoral pores.

I can see no grounds for retaining *Mimetozoon* as a distinct genus. It has all the characters of *Cosymbotus*, except that they are in a more highly specialized form.

KEY TO THE SPECIES

Digits half webbed; back with small uniform granules	*platyurus*.
Digits nearly fully webbed, back with small granules and large rounded tubercles ...	*craspedotus*.

Cosymbotus platyurus.

Hemidactylus platyurus, Boulenger, p. 45.

Cosymbotus craspedotus.

Mimetozoon craspedotus, Boulenger, p. 46; Robinson and Kloss, Journ. F. M. S. Mus., V. 1915, p. 153; M. A. Smith, Journ. N.H.S. Siam, II, 1916, p. 152.

Robinson and Kloss found this lizard common on Koh Samui in the Gulf of Siam and I found it common on tree-trunks at the foot of Ronpibun Hill in the Nakon Sritamarat mountains. It has also been obtained at Bangnara, Patani, by Mr. C. J. Aagaard.

Holtzinger-Tenever records the species from Java (Arch. Natg. Berlin, Abt. A. Helt. II, LXXXV, 1920, p. 100). Mr. Sworder obtained one in Perak.

Genus **Ptychozoon**

Ptychozoon kuhli.

Ptychozoon homalocephalum, Boulenger, p. 52.

Ptychozoon kuhli, Stejneger, Proc. Biol. Soc. Washington, XV, p. 37 (1902).

Lacerta homalocephala Creveldt, 1809, is preoccupied by *Lacerta homalocephala* Suckow, 1798 and cannot therefore be used.

Ptychozoon horsfieldii, Boulenger, p. 53.

Genus **Phyllodactylus**

Gray Spicil. Zool., 1830, p. 3; Boulenger, Cat. Liz. Brit. Mus., I. p. 76 (1885).

Digits more or less slender, free, all clawed, with transverse lamellae or tubercles inferiorly, the extremity more or less dilated, with two large plates inferiorly, separated by a longitudinal groove in which the claw is retractile; the distal expansion covered above with scales strongly differentiated from those on the basal portion of the digit. Upper surfaces covered with juxtaposed scales, uniform or intermixed with larger tubercles; abdominal scales generally imbricate. Pupil vertical; males without preanal or femoral pores (except in *P. siamensis*).

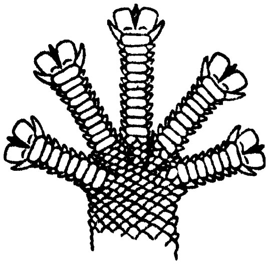

Fig. 2. Hand of *Phyllodactylus siamensis*.

The genus is widely distributed throughout the world; one species only inhabits Asia.

Phyllodactylus siamensis.

Boulenger, P.Z.S., 1898. p. 918, fig.; Annandale Ann. Mag. Nat Hist, (7) XV, 1905, p. 28; M. A. Smith, Journ. N.H.S. Siam, II, 1916, p. 52.

Snout rounded, longer than the distance between the eye and the ear-opening; ear opening vertically oval, half or less than half the diameter of the eye. Rostral quadrangular, broader than high, with median cleft above. Nostril bordered by the rostral, an internasal and several small scales. Seven or eight upper and six or seven lower labials; mental triangular; a pair of large chin-shields in contact with one another behind the mental followed by one or two smaller pairs on the outer side of the first pair.

Snout covered with equal, rather large granules, back of head with minute granules intermixed with larger rounded ones. Back covered with small granules and trihedral strongly keeled tubercles forming 8 to 12 very regular longitudinal series; on the sides the enlarged scales lose their keels and pass gradually into the rather large imbricate, ventral scales of which there are from 20 to 25 across the belly.

Tail covered with imbricate scales, the dorsals keeled; a ventral series of enlarged, lamellar scales.

Limbs moderate, digits rather short, moderately dilated at the end, with narrow, transverse lamellae inferiorly, 10 to 14 under the fourth toe.

Male with 6 or 7 preanal pores in an obtuse-angled series.

From snout to vent 50 mm.; tail 58 mm.

Grey or greyish brown above, uniform or with irregular black spots and blotches. Intergradation between the two colour forms is rare.

I have examined a specimen from Langsuan (Lat. 10° N.) in the Malay Peninsula. Farther north in Siam it is common, being particularly abundant along the railway track, both on the open line and about the timber-stacks in the stations. Its extension into the Malay Peninsula appears to be due to the building of the line from Bangkok to Penang.

Phyllodactylus burmanicus Annandale (Ann. Mag. Nat. Hist., (7) XV, 1905, p. 28, and Journ. Asiat. Soc. Bengal, I, 1905, p. 83), from Tavoy, I regard as identical with *P. siamensis*, the characters upon which it has been separated being insufficient when a large series of *P. siamensis* is examined. Altogether I have examined about 80 specimens of *P. siamensis* from various parts of Siam.

Family **Agamidae**

An agamid under the name of *Salea rosaceum* was desrribed in 1889 by Thominot (Bull. Soc. Philom. Paris, (8) I, p. 24) as having come from Singapore. From the description it was not a *Salea*—a genus at present confined to southern India—and the specimen, originally in the Paris Museum, cannot now be found.

Genus **Draco**

One species *Draco taeniopterus* Gunther, is added to the fauna of the Peninsula.

Draco volans, Boulenger, p. 57.

The species has not been found north of Nakon Sritamarat, Lat. 8° 30′ N. There are specimens in the Raffles Museum obtained on Pulau Tioman.

Draco maculatus.

Boulenger, p 58; M. A. Smith, Journ. N.H.S. Siam, II, 1916, p. 152; (Nakon Sritamarat); Robinson and Kloss, Journ. F. M. S. Mus., V, 1915, p. 154 (Koh Samui).

Information as to the exact distribution of this species in the Malay Peninsula is still needed. It is the commonest flying-lizard in Siam and has been obtained as far south as Nakon Sritamarat. Cantor (1849) recorded four specimens taken in the hills of Penang, and Boulenger in his Catalogue of Lizards, 1885, records it from Singapore but does not state upon what evidence. In neither of these localities has it been obtained since.

Draco fimbriatus.

Boulenger, p. 59; M. A. Smith, Journ. N.H.S. Siam, II, 1916, p. 152 (Peninsular Siam) and Journ. F. M. S. Mus., X, 1922, p. 268 (Gunong Tahan).

Common at Bangnara, in Patani, and has been found also in the Nakon Sritamarat mountains farther north. A specimen was recently taken (1922) at Wray's camp on Gunong Tahan.

Draco punctatus.

Boulenger, p. 59; M. A. Smith, Journ. N.H.S. Siam, II, 1916, p. 153 (Patani).

A third specimen of this rare *Draco* has been obtained at Bangnara in Patani.

Draco cyanolaemus.

Boulenger, p. 60; Robinson and Kloss, Journ. F. M. S. Mus., V, 1915, p. 154 (Bandon).

Robinson and Kloss record two specimens obtained in the Nakon Sritamarat mountains. It has also been found on the Adang Islands, north of Penang.

Draco blanfordi.

Boulenger, p. 61; M. A. Smith, Journ. N.H.S. Siam, II, 1916, p. 153 (Peninsular Siam).

Adult males have a low but distinct caudal crest. In some individuals blackish transverse bands upon the wing-membranes are more or less evident.

Robinson and Kloss in 1919 obtained it on the islands of Pipidon and Puket; also at Nong Kok and Krabi on the west coast of Peninsular Siam, and at Tapli and Tasan in the Pakchan estuary. The range of the species extends over the whole of Siam.

Draco formosus.

Boulenger, p 61; M. A Smith, Journ. N.H.S. Siam, II, 1916, p. 152 (Peninsular Siam).

The species has been recorded from Patani, the Nakon Sritamarat mountains and from Maprit, Patiyu, just north of the Isthmus of Kra.

The throat of the female is coloured red like that of the male, not green as generally stated.

Draco taeniopterus.

Draco taeniopterus Gunther, P.Z.S., 1861, p. 187 and Rept. Brit. Ind., 1864, p. 126, pl. 13, fig. E; Boulenger, Fauna Brit. Ind., p. 113 (1890).

Description. Head small; snout about as long as the diameter of the orbit; nostrils directed upwards, perfectly vertical; tympanum naked, smaller than the eye-opening. Upper head-scales unequal, strongly keeled; 7 to 9 upper labials. Gular appendage of the male slightly longer than the head, covered with very large scales; in the female it is represented by a small tag.

Dorsal scales equal, feebly keeled, not larger than the ventrals, a lateral series of enlarged, distant scales along either side of the body. The fore-limb stretched forward extends well beyond the snout; the hind-limb reaches the axilla or just beyond.

Greyish or brownish above, with metallic gloss; wing membranes above with five arched transverse black bands, about as wide as the interspaces between them; some of these bands may be forked at the base and enclose large light spots; wing membranes uniform below. In living specimens the throat is of a pale greenish colour and the insides of the wattles vary from pale to deep red. The posterior margin of the wing may have a broad band of maroon.

Length of head and body 75; tail 150 mm.

Distinguished from *D. formosus* by the longer hind-limb (not always reliable), shorter body, smaller size and more brilliant colouring, the bars upon the wing-membranes being broader and jet-black in colour.

Many examples of this lizard were obtained by Robinson and Kloss in their expedition up the west coast of Peninsular Siam in 1919. Specimens were obtained at Tung Pran, Koh Rah, Nong Kok, Delisle Is. and Koh Boi; also at Victoria Point, Mamoh and Tapli in the Pak Chan estuary. I have also seen examples from the hills near Bandon. The species extends north into Central and South-eastern Siam.

Draco microlepis.

Boulenger, p 62; Robinson and Kloss, Journ. F. M. S. Mus., V, 1915, p. 154 (Koh Pennan).

Draco melanopogon.

Boulenger, p. 62; Robinson and Kloss, Journ. F. M. S. Mus., V, 1915, p. 154 (Bandon); M. A. Smith, Journ. N.H.S. Siam, II, 1916, p. 154, (Nakon Sritamarat) and Journ. F. M. S. Mus., X, 1922, p. 268 (Kuala Tahan); Sworder, S'pore. Nat., No. 5, 1925, p. 66 (Singapore).

In addition to the above records it has been obtained by Robinson and Kloss at Krabi and Tasan in Peninsular Siam and by Mr. Norman Smedley, on Pulau Tioman.

Draco quinquefasciatus.

Boulenger, p. 63; M. A. Smith, Journ. N.H.S. Siam, II, 1916, p. 154 (Patani).

Draco maximus, Boulenger, p. 63.

Genus **Aphaniotis**

De Rooij has pointed out that a gular sac is indicated. Specimens in the Raffles Museum have a distinct gular sac, though not comparable with that in other genera (*e.g. Draco*).

Aphaniotis fusca.

Aphaniotis fusca, Boulenger, p. 64; Sworder, Journ. Malay. Br. R. Asiat. Soc. VII, 1929, p. 327 and text figures.

Aphaniotis floweri Werner, Zool. Jahrb., Syst., XIII, 1900, p. 486.

Two specimens recently obtained by my native collector in Patani mark the northern range of this species.

Three specimens were collected on Pulau Tioman.

Genus **Gonocephalus**

Gonyocephalus, p. 65.

The original spelling is preserved. Two species are added, and the amended key will read as follows:—

Supraciliary border normally raised.................................... ....*borneensis, harveyi, grandis, robinsoni.*

Supraciliary border strongly raised.

Dorsal crest almost as high as nuchal ... *doriae.*

Dorsal crest much lower than nuchal ... *chamaeleontinus*

Gonocephalus grandis.

Gonyocephalus grandis, Boulenger, p. 66.

A male, a female and three juveniles were obtained by my collector near Setun, Lat. 6° 40″ N. Two specimens were recently obtained on Pulau Tioman.

Gonocephalus robinsoni.

Gonyocephalus robinsonii, Boulenger, p. 67; M. A. Smith, Journ. F. M. S. Mus., X, 1922, p. 269.

I have examined a specimen from the Cameron Highlands, Pahang (alt. 4,800 feet) and two more from Lipis district (alt. 3,500 feet). All have a few enlarged and differentiated scales upon the flanks. The number of scales round the body varies from 70 to 90.

Gonocephalus borneensis.

Gonyocephalus borneensis, Boulenger, p. 65; Sworder, S'pore. Nat. No. 5, 1925, p. 66.

Sworder records a juvenile collected on Singapore Island. The locality is almost certainly incorrect.

Gonocephalus harveyi.

Gonyocephalus harveyi, Boulenger, p. 66.

The species has been recently obtained on Pulau Tioman.

Gonocephalus doriae

Gonyocephalus doriae Peters, Mon. Berlin Ac., 1871, p. 570; De Rooij, Rept. Indo-Austral. Archipel., I, 1915, p. 100.

Snout equal to or slightly longer than the diameter of the orbit; canthus rostralis strongly projecting; supraciliary border strongly raised, forming an angle at its posterior part; tympanum distinct, smaller than the eye-opening. Head-scales moderate in size, smooth; no enlarged scales on the temple; 11 or 12 upper and the same number of lower labials. Gular sac well-developed, with serrated anterior border, covered with smooth scales. Body strongly compressed; nuchal and dorsal crests continuous, almost equal, beginning between the posterior border of the orbits, its height not quite equal to the diameter of the orbit, composed of triangular scales, covered at the base with large quadrangular ones. Dorsal scales small, equal, smooth, slightly imbricate; ventral scales much larger, smooth. Tail strongly compressed, with serrated edge above and covered with large smooth scales, the two lowermost rows of which are strongly keeled. Limbs slender; the hind-limb reaches the orbit; third and fourth fingers equal.

Olive-brown or greenish above, with dark spots on each side of the back; tail with dark annuli. Juveniles have dark spots round the eye and on the lips, and a dark gular fold.

Length of head and body 135; tail 200 mm.

Two immature examples obtained by my native collector at Benang Star, Patani, I refer to this species. They differ from the typical form in having a series of three or four enlarged and differentiated, slightly keeled scales, on either side of the back. *G. doriae* is otherwise known only from Borneo.

G. abbotti Cochran, Proc. U. S. Nat. Mus., vol. 60, 1922, p. 1, described from a female example obtained at Trang, is probably referable to this species.

Gonocephalus chamaeleontinus.

Iguana chamaeleontina Laurenti, Syn. Rept., 1768, p. 47.

Gonyocephalus chamaeleontinus, Boulenger, Cat. Liz., 1887, I, p. 285; De Rooij, Rept. Indo-Austral. Archipel., 1915, I, p. 102.

Snout as long as the diameter of the orbit, with rounded elevation in the female; canthus rostralis projecting; supraciliary border strongly raised, angular posteriorly; tympanum distinct about half the diameter of the eye-opening. Head-scales moderate in size, unequal, smooth: a few enlarged tubercles above the ear; ten to twelve upper and twelve to fourteen lower labials. Gular sac large, with serrated anterior border, covered with smooth scales moderate in size. Body strongly compressed; nuchal and dorsal crests continuous, beginning on a line with the posterior border of the orbit, the former very high, its height equalling the length of the snout; it is composed of long compressed scales, with three rows of smaller ones at the base; dorsal crest much lower, reduced to ridge posteriorly. Dorsal scales moderately small, smooth, with enlarged ones here and there; ventral scales much larger, smooth. Tail strongly compressed, one and a half to one and three quarters times as long as the head and body, with serrated upper edge; covered above with large, smooth or feebly keeled scales, below with larger strongly keeled ones. Limbs long and slender; the hind-limb reaches the posterior border of the orbit; scales of limbs unequal, smooth or feebly keeled; third finger a little shorter than fourth.

Olivaceous above, with dark reticulations and transverse bands; dark lines radiating from the eye; tail with light and dark annuli; below brownish.

Head and body 156, tail 256 mm.

Previously recorded from the Mentawi Islands, Sumatra, Java and the Natunas. A specimen has been recently obtained on Pulau Tioman by Mr. N. Smedley of the Raffles Museum.

Genus **Acanthosaura**

Acanthosaura armata.

Acanthosaura armata, Boulenger, p. 68; M. A. Smith, Journ. N.H.S. Siam. II, 1916, p. 53 (*crucigera=armata*)

Acanthosaura crucigera, Boulenger, p. 69;

Specimens of this lizard were obtained by Mr. Norman Smedley on Pulau Tioman.

Acanthosaura horrescens Andersson, Kungl. Sven. Vetakad. Hand, Band 55, 1916, p. 55, I believe to be a northern race of *A. armata*, differing from it in having a more or less developed gular pouch. Examination of material from all parts of Siam shews that a feebly developed pouch is present in examples from the region of the Isthmus of Kra. and that its maximum development is attained in specimens from northern Siam and Cambodia. It is present in both sexes but is larger in the males than in the females. Juveniles have no pouch.

Genus **Calotes***

One species is added. The eggs of *C. versicolor* and *C. microlepis* are oval-shaped.

KEY TO THE SPECIES

I. No fold in front of the shoulder.
  A. Lateral scales pointing downwards and backwards;
    Dorsal scales larger than the ventrals; 50—57 round the body; gular pouch not developed ... ... *floweri*.

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*I take this opportunity to record that *Calotes aberrans* Rosen, Ann. Mag. Nat. Hist., (7) XVI, 1905, p. 133, pl. 8, is in my opinion a specimen of *Cophotis sumatrana* Hubrecht. De Rooy in her Reptiles of the Indo-Australian Archipelago, I, 1915, omits to mention the name. Through the kindness of Dr. H. Wallengren of the Zoological Institute of Lund I have been able to examine Rosen's type, collected in Tjibodas, Java. It is a female with three well developed eggs, and has all the characters of *Cophotis* Peters. The tympanic area is covered by a single large keeled scale and the tail, though now much shrivelled, was evidently prehensile. The dorsal crest is just indicated. Except that it has no rostral appendage it agrees entirely with Hubrecht's description drawn up from a single male specimen obtained in Sumatra.

Dorsal scales larger than the ventrals; 39 round the body; gular pouch well developed ... ... *flavigula.*
Dorsal scales smaller than the ventrals; 50—100 round the body ... ... *cristatellus.*
B. Lateral scales pointing backwards and upwards; 35—50 round the body ... ... *versicolor.*
II. An oblique curved fold in front of the shoulder ... ... *emma.*

Calotes floweri.

Boulenger, p. 70; M. A. Smith, Journ. F. M. S. Mus., X, 1922, p. 269.

A specimen was obtained on Gunong Gedang, Pahang, alt. 6,400 feet, in 1922. The range of the species extends into Cambodia.

Calotes cristatellus.

Boulenger, p. 70; M. A. Smith, Journ. F. M. S. Mus., X, 1922, p. 269.

This lizard is rare north of Lat. 7° N., but a specimen has been taken on the Langbian plateau (S. Annam).

As pointed out by me in 1922, Boulenger's statement that the number of scale-rows round the body varies from 57 to 120 appears to be a slip. I have never seen a specimen with more than 100.

Calotes flavigula.

M. A. Smith, Journ. F. M. S. Mus., XI, 1924, p. 183.

Head elongate, the snout longer than the width of the orbit. Upper head-scales fairly large, unequal in size, feebly keeled on the supraorbital region; tympanum half the diameter of the orbit; gular pouch well developed, covered with smooth scales, those along the edge being very small; six upper and six lower labials. Nuchal crest formed of six small spines; dorsal crest a mere ridge. Thirty-nine scales round the middle of the body, all the dorsals, except the uppermost row, directed backwards and downwards, feebly keeled; laterals larger, smooth; ventrals smallest, strongly keeled.

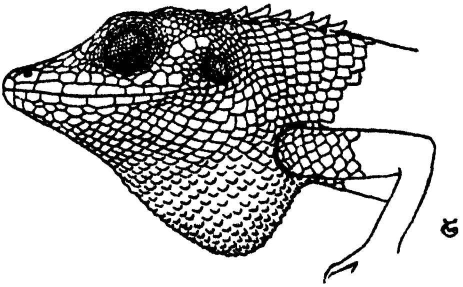

Fig. 3. *Calotes flavigula.*

The hind-limb reaches the axilla, the fore-limb to beyond the tip of the snout; third and fourth fingers equal; third toe a little shorter than the fourth. Tail moderately long, compressed.

Dark-brown on the back, greyer on the head; lips white with dark vertical streaks; large white spots on the shoulders and flanks; gular pouch bright yellow in life.

From snout to vent 68 mm., tail 127 mm.

Allied to *C. floweri* Boulenger, but differing in the larger body-scales, fewer supralabials, well developed gular pouch and coloration.

Still known only from the type (♂) specimen collected in the Cameron's Highlands.

Calotes versicolor, Boulenger, p. 71.

Calotes emma, Boulenger, p. 72.

Specimens have been obtained on Pulau Rumpia.

Genus **Liolepis**

Liolepis belliana, Boulenger, p. 73.

K. P. Schmidt has recently (Bull. Amer. Mus. Nat. Hist. LIV, 1927, p. 416) referred to this species under the name of *Liolepis belli*, perhaps on the understanding that the first reference to this species is by Gray in Zool. Journ., III, 1827, p. 216, as mentioned by Sherborn in his Index Animalium. This is unfortunately an error: *belli* does not occur on p. 216 of the Zool. Journ., and Mr. Sherborn tells me he cannot explain how the slip arose. The first mention of this species is under the name of *belliana* on p. 220 of the Journal, as stated by Boulenger.

Family **Varanidae**

Genus **Varanus**

Varanus flavescens, Boulenger, p. 76.

Varanus nebulosus, Boulenger, p. 77.

Varanus dumerilii, Boulenger, p. 77.

Varanus rudicollis, Boulenger, p. 78.

Varanus salvator, Boulenger, p. 78.

Family **Lacertidae**

Genus **Takydromus**

Tachydromus; p. 79.

The original spelling is preserved.

Takydromus sexlineatus,

Tachydromus sexlineatus, Boulenger, p. 79.

The sexes in adult life can be easily distinguished, the male being more brightly coloured than the female. The light dorsolateral band, with its black edging, is inconspicuous or almost absent in the female and the general colour is paler. Young ones resemble the female in coloration.

Family **Scincidae**

The genus *Tropidophorus* is added, one of its members having been discovered in the extreme north of the Peninsula.

The introduction of the Australian scink, *Egernia depressa,* Gunth., into Singapore has been chronicled by Mr. F. N. Chasen (Journ. Malay. Br. Royal Asiat. Soc., III, 1925, p. 100); whether it will establish itself as a permanent inhabitant of this region remains to be seen.

KEY TO THE GENERA

I. Tympanum exposed and superficial ... *Tropidophorus.*

II. Tympanum if distinct, more or less deeply sunk.

Pterygoid bones separated in the middle of the palate, the palatal notch extending anteriorly to a line connecting the centres of the eyes ... ... *Mabuya.*

Pterygoid bones in contact in front, the palatal notch not extending to between the centres of the eyes ... *Lygosoma.*

Genus **Tropidophorus**

Palatine and pterygoid bones in contact on the middle line of the palate which is toothless. Teeth conical. Eyelids well developed, scaly. Tympanum exposed, superficial. Nostril pierced in a single nasal; no supranasals; prefrontals well developed; interparietal distinct. Limbs well developed, pentadactyle; digits cylindrical, with transverse lamellae inferiorly.

Range. The Indo-Chinese Peninsula and Malay Archipelago, Queensland.

Tropidophorus robinsoni.

M. A. Smith, Journ. N.H.S. Siam, III, 1919, p. 223.

Upper head-shields feebly striated; a single frontonasal, nearly as broad as long; prefrontals in suture; frontal as long as, or a little longer than, the frontoparietal and interparietal together; parietals in suture behind the interparietal; four supraoculars, the first longest; six supraciliaries anterior to the fourth supraocular, which enters the supraciliary border; nostril pierced in a single nasal; a single anterior loreal, succeeded by another of about the same size; six supralabials, the fourth largest and subocular; temporals small and scale-like except one in contact with the parietal which is usually much larger; a single post-mental; tympanum nearly as large as the eye-opening; 30 or 32 scales round the middle of the body, dorsals strongly keeled, not mucronate; nuchals tri- or multicarinate; laterals keeled, a little smaller than the dorsals and directed straight backwards; gular scales smooth or feebly keeled; ventrals smooth; a pair of large preanals; caudal scales keeled, except the median series below; the hind-limb reaches the wrist or not quite so far; 17 or 18 subdigital lamellae beneath the fourth toe.

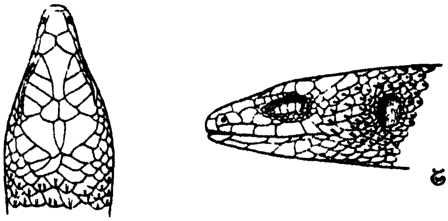

Fig. 4. *Tropidophorus robinsoni.*

Brownish or blackish above, with light brown, black-edged cross bars or alternating spots, the first on the nape; sides of body and tail with small white spots; below yellowish-white, the belly uniform, the throat and tail more or less thickly spotted with black; head blackish, labials with white spots.

Length of head and body 75 mm.; tail 95 mm.

Type locality Tasan, West of Chumporn, where it is common. I have also examined specimens in the Indian Museum from Tavoy.

Genus **Mabuya**

Mabuia, p. 82.

The original spelling is preserved. In this genus *M. siamensis* becomes *M. longicaudata*. *Lygosoma praesigne* Boulenger, is removed from *Lygosoma* and placed under *Mabuya.*

Mabuya novemcarinata, Boulenger, p. 82.

Mabuya macularia.

Mabuia macularia, Boulenger, p. 83.

There are three examples in the Raffles Museum from Tebing Tinggi, Kelantan. I have also obtained specimens from Bangnara, Patani and from the Nakon Sritamarat mountains.

Mabuya multifasciata.

Mabuia multifasciata, Boulenger, p. 84; Sworder, S'pore. Nat. No. 5, p. 67 (Singapore).

Mabuya rugifera.

Mabuia rugifera, Boulenger, p. 83; Sworder, S'pore. Nat. No. 5, 1925, p. 67 (Singapore).

I have seen a specimen from Benang Star, Patani.

Mabuya longicaudata.

Euprepis longicaudata Hallowell, Trans. Amer. Philos. Soc., XI, 1856. p. 77. pl. IV.

Mabuia siamensis, Boulenger, p. 84.

Mabuya longicaudata, Stejneger, Herpet. Japan, p. 214 (1907).

As shewn by Stejneger, Hallowell's *Euprepis longicaudata* and Gunther's *Eumeces siamensis* are identical and the earlier name must therefore be used.

The species has been met with on Pulau Tioman.

Mabuya praesigne.

Lygosoma praesigne, Boulenger, p. 88.

Mabuia praesigne, M. A. Smith, Journ. N.H.S. Siam, II, 1916, pp. 55 and 156.

This lizard has been found in the Nakon Sritamarat mountains; it is probably not as common in the Peninsula as it is recorded to be. Examples with only 26 scales round the body have been met with. The species can be distinguished from the other members of the genus in having no supranasal shields.

Genus **Lygosoma**

Seven species are added, and one, *L. singaporense* removed. The amended key will read as follows:—

I. Limbs well developed, pentadactyle, ear opening distinct.

A. Lower eyelid scaly; no supranasals.

1. The adpressed limbs overlap.

24 scales round the body ... ... *stellatum.*

30 to 42 scales round the body.

a. Four supraoculars; the hind limb does not reach the axilla.

36 to 38 scales round the body; a dark band along the upper part of the flank ... ... *indicum.*

34 to 36 scales round the body; no dark band; back with black spots arranged in series ... *tersum.*

b. Four supraoculars; the hind-limb reaches nearly to the eye ... *anomalopus.*

c. Five supraoculars.

30 to 32 scales round the body; no nuchals ... *scotophilum.*

32 to 34 scales round the body; a light vertebral line present ... ... *sanctum.*

38 to 42 scales round the body; nuchals present ... *maculatum.*

2. The adpressed limbs just touch or fail to meet.

Fourth toe not or scarcely longer than third; ear very distinct; 30 to 32 scales round the body. *butleri.*

Fourth toe distinctly longer than third; ear very distinct. 32 scales round the body ... *malayanum.*

Fourth toe distinctly longer than third; ear small; 38 scales round the body ... ... *cameronicum.*

B. Lower eyelid scaly; supranasals present.

1. The adpressed limbs overlap. 28 to 30 scales round the body, dorsals with 5 to 9 keels ... *olivaceum.*

2. The adpressed limbs do not meet; 26 to 30 scales round the body.

a. Subocular shield very long, at least twice as long as the shield preceding it.

Dorsal scales smooth or indistinctly tricarinate ... *bowringii.*

Dorsal scales quinquecarinate ... ... *herberti.*

b. Subocular shield not twice as long as the shield preceding it.

26 to 28 smooth scales round the body ... *albopunctatum.*

30 scales round the body, dorsals tricarinate ... *opisthorhodum.*

38 to 40 scales round the body ... ... *bampfyldii.*

C. Lower eyelid with an undivided transparent disc.

Frontoparietal single; supranasals present ... *atrocostatum.*

Frontoparietal double; supranasals absent.

28 to 30 scales round the body, vertebrals enlarged ... ... *vittigerum.*

34 to 38 scales round the body, vertebrals not enlarged ... ... *melanostictum.*

II. Limbs well developed, pentadactyle; ear covered with scales.
  Frontoparietal single; 18 or 20 scales round the body; back with black longitudinal lines ... ... *quadrivittatum.*
  Frontoparietal single; 20 scales round the body; back uniform ... ... *surdum.*
  Frontoparietal double; 22 scales round the body ... ... *cophias.*
III. Limbs rudimentary.
  Digits five, a punctiform ear opening; 24 to 26 scales round the body ... ... *quadrupes.*
  Digits two; ear hidden; 26 scales round the body ... ... *larutense.*
  Digits two to the fore-limb; hind-limb undivided; 22 scales round the body ... *miodactylum.*

Lygosoma stellatum.

Lygosoma stellatum, Boulenger, p. 87; M. A. Smith, P.Z.S., 1921, p. 431.

The range of the species extends to southern Annam.

Lygosoma indicum.

Hinulia indica, Gray, Ann. Mag. Nat. Hist., (2) XII, 1853, p. 388.

Lygosoma indicum, Boulenger, Fauna Brit. Ind., p. 195 (1890); and Fauna Malay Pen., p. 87, fig. 24, M. A. Smith, Journ. F. M. S. Mus., X, 1922, p. 270.

Distance between the end of the snout and the fore-limb 1⅓ to 1½ times in distance between the axilla and groin. Snout obtusely pointed; lower eyelid scaly; no supranasals; rostral convex, in good contact with the frontonasal; frontonasal broader than long, in narrow contact with the frontal; frontal as long as the frontoparietals and interparietal together, in contact with two (sometimes three) supraoculars; four large supraoculars, the second the largest; parietals in suture behind the interparietal; no nuchals; seven supralabials the fifth and sixth below the eye. Ear-opening oval, scarcely smaller than the eye-opening; no auricular lobules. 34 to 38 smooth scales round the middle of the body, the laterals smallest; a pair of large preanals.

Limbs well developed, pentadactyle; the hind-limb reaches the elbow of the adpressed fore-limb or not quite so far. Digits rather elongate, compressed; 17 to 20 sub-digital lamellae under the fourth toe. Tail 1½ to 2 times as long as the head and body.

Light or dark brown above, uniform or with scattered darker dots; a dark band along the side of the head and upper half of the body, light-margined above, often spotted with white; lower surface whitish.

From snout to vent 85 mm.; tail 160 mm.

Range. From the Eastern Himalayas to Annam and the Malay Peninsula. Two specimens were obtained in 1922 on Fraser's Hill.

Lygosoma tersum.

M. A. Smith, Journ. N.H.S. Siam, II, 1916, p. 44, fig.

Distance between the end of the snout and the fore-limb 1¼ times in distance between the axilla and groin. Lower eyelid scaly. Snout obtusely pointed; rostral convex, in contact with the frontonasal; no supranasals· prefrontals forming a suture; frontal as long as the frontoparietals and interparietal together, in contact with the first two supraoculars; four large supraoculars, the second the largest; parietals in suture behind the interparietal; no nuchals. Seven supralabials, the fifth and sixth below the eye. Ear-opening oval, smaller than the eye-opening; no auricular lobules. 34 to 36 smooth scales round the middle of the body, the laterals smallest. A pair of large preanals.

Limbs well developed, pentadactyle; the hind-limb reaches the elbow of the adpressed fore-limb. Digits rather elongate, compressed: 18 to 20 subdigital lamellae beneath the fourth toe.

Dark brown above, with more or less distinct black spots which are arranged in longitudinal series. Sides of body paler, with or without similar markings: below white; lips with dark bars.

From snout to vent 90; tail 170 mm.

The species was first obtained on Khao Wang Hip, in the Nakon Sritamarat mountains. It has since been obtained at Tasan, in the Pak Chan estuary (Isthmus of Kra).

Lygosoma anomalopus, Boulenger, p. 90.

Lygosoma scotophilum, Boulenger, p. 88.

The species has been met with on Pulau Tioman. Its range also extends to Sumatra (Boulenger, Journ. F. M. S. Mus., VIII, 1920, p. 289).

Lygosoma sanctum, Boulenger, p. 89.

Lygosoma maculatum, Boulenger, p. 89.

Lygosoma butleri.

Boulenger, p. 91; M. A. Smith, Journ. F. M. S. Mus., X, 1922, p. 270.

A specimen obtained by the F. M. S. Museums in 1922 on Fraser's Hill differs from the description of the types in the following particulars:—

Distance between the end of the snout and the fore-limb 1⅓ times in distance between the axilla and groin; 10 and 11 sub-digital lamellae beneath the fourth toe.

Brown above and on the sides, thickly spotted with yellow; no dark lateral band; below yellowish.

Lygosoma malayanum, Boulenger, p. 91.

Lygosoma cameronicum.

Sphenomorphus cameronicus, M. A. Smith, Journ. F. M. S. Mus., X, 1924, p. 184, fig.

Body elongate, the distance between the end of the snout and the fore-limb $1\frac{2}{3}$ times in distance between the axilla and groin. Snout rounded; lower eyelid scaly; no supranasals; ear opening moderate, about half the size of the eye-opening; no auricular lobules. Rostral convex, in broad contact with the frontonasal; frontonasal twice as broad as long, in contact with the frontal; frontal as long as the frontoparietals and interparietal together, in contact with the first two supraoculars; four large supraoculars, the second the largest; frontoparietal twice as large as the interparietal; parietals in contact behind the interparietal; no nuchals; two loreal shields one behind the other; seven supralabials, the fifth and sixth below the eye.

Thirty-eight smooth scales round the middle of the body, subequal; a pair of enlarged preanals.

Limbs well developed, but short, just meeting when adpressed; fourth toe much longer than third, with 20 to 22 lamellae beneath it. Tail thick, long, more than twice the length of the head and body.

Dark-brown above, spotted with black; a black band along the upper half of the body extending on to the tail, spotted with white; below white.

From snout to vent 65 mm.; tail 140 mm.

Still known only from the type specimen obtained in Cameron's Highlands (Lipis district).

Lygosoma olivaceum.

Boulenger, p. 91; M. A. Smith, Journ N.H.S. Siam, II, 1916, p. 156 (Patani); and Journ. F. M. S. Mus., X. 1922, p. 270 (Kuala Tahan).

The range of this scink extends into Siam and Cambodia. Mr. Norman Smedley obtained specimens on Pulau Tioman.

Lygosoma bowringii.

Boulenger, p. 92; M. A Smith, Journ. N.H.S. Siam, II, 1916, p. 156 (Patani); Sworder, S'pore. Nat. No. 5, pp. 68 and 101 (Singapore and Negri Sembilan).

This scink has been obtained at Bangnara, Patani, also at Port Dickson and on Singapore Island.

Lygosoma herberti.

M. A. Smith, Journ. N.H.S. Siam, II, 1916, p. 45.

Distance between the end of the snout and the fore-limb $1\frac{4}{5}$ to 2 times in distance between the axilla and groin. Snout obtuse; lower eyelid scaly; supranasals present, in contact behind the rostral; rostral convex, frontonasal broader than long, in good contact with the frontal; frontal as long as the interparietals and parietal together, in contact with two supraoculars; four large supraoculars, the second the largest; parietals in suture behind the interparietal; seven supralabials, the fifth below the eye and very long, nearly as long as the three preceding it together. Ear-opening, small, rounded, with small auricular lobules. Twenty-eight scales round the middle of the body, subequal, the dorsals with five keels. Preanals feebly enlarged.

Limbs short, pentadactyle; the adpressed limbs are widely separated. Digits moderately long, compressed, the fourth toe a little longer than the third with 14 sub-digital lamellae. Tail not much longer than the head and body.

Bronze-brown above, paler below. A more or less distinct dark lateral band along the side of the head and body, usually with lighter spots.

From snout to vent 67 mm.; tail 75 mm.

Originally discovered at the foot of Khao Wang Hip in the Nakon Sritamarat mountains, it has since been obtained at Klong Tun Sai on the island of Puket and at Tung Pran, Takua Pa.

Lygosoma albopunctatum, Boulenger, p. 93.

Lygosoma opisthorhodum.

Lygosoma (Riopa) ophisthorhodum Werner, Mitt. Naturh. Mus. Hamburg, 1910, XXVII, p. 45.

Lygosoma opisthorhodum, De Rooij, Rept. Indo-Austral. Archipel. 1915, I, p. 265.

A single immature example of this scink was taken on Maxwell's Hill, Perak, at 3,600 feet and is now in Raffles Museum. It agrees entirely with Werner's description. Length of head and body 30; tail 38 mm. The species is otherwise known only from the type locality in sumatra. [For description see p. 134, post.].

Lygosoma bampfyldii, Boulenger, p. 93.

Lygosoma vittigerum.

Boulenger, p. 94; M. A. Smith, Journ. N.H.S. Siam, II, 1916, p. 156 (Patani) and Journ. F. M. S. Mus., X, 1922, p. 270 (Kuala Teku).

A tree-loving lizard and probably more common in the Peninsula than is recorded. Specimens have been obtained at Kuala Teku (Pahang), Jor (Perak), Bangnara (Patani) and Tasan (Isthmus of Kra). The examples from K. Teku have 30 scales round the body.

The range of the species extends into north Siam and French Indo-China. There is a specimen from Sandakan, Borneo, in the British Museum, and from Pulau Tioman in the Raffles Museum.

Lygosoma atrocostatum.

Lygosoma atrocostatum, Boulenger, p. 94.

Lygosoma singaporense, Boulenger. p. 95; Sworder. S'pore. Nat. No. 3, 1924 p. 16 and No. 5, 1925. p. 68.

Sworder has given a very full account of this beach-loving lizard in the "Singapore Naturalist", both as regards its scale-characters and habits. His series fully justifies Annandale's contention that *singaporense* and *atrocostatum* should be united.

The number of scales round the body in specimens from the Malay Peninsula and immediate vicinity varies from 34 to 40. The number of supraocular shields also varies. Sworder (No. 3) records several specimens with five on one or both sides, and one with five has been obtained recently at Port Dickson. The type of *Mabouya jerdoniana* from Pulau Tikus is described as having seven, but a topotype obtained by Flower has only five. The type of *Lygosoma singaporense* is described as having four and five shields respectively.

Lygosoma melanostictum.

Boulenger. Ann Mus. Genova, (2) V, 1887, p. 479. pl. vii, fig. 2; M. A. Smith, Journ. N.H.S. Siam, II, p. 50, 1916 (Nakon Sri-Tamarat).

Habit lacertiform; distance between the end of the snout and the fore-limb 1⅓ to 1⅜ times in distance between the axilla and groin. Snout short, obtuse. Lower eyelid with an undivided transparent disk. Nostril pierced in the nasal; no supranasals; fronto-nasal much broader than long, forming a broad suture with the rostral; prefrontals separated or forming a median suture; frontal about as long as the frontoparietals and interparietal together, in contact with the two anterior supraoculars; 4 supraoculars, first longer than second; 9 or 10 supraciliaries; parietals in suture behind the interparietal; no enlarged nuchals; fifth and sixth supralabials below the centre of the eye. Ear-opening oval, a little smaller than the eye-opening; no auricular lobules. Thirty-four to thirty-eight smooth scales round the middle of the body, laterals smallest. A pair of slightly enlarged preanals. The adpressed limbs hardly meet, or slightly overlap. Digits subcyclindrical; subdigital lamellae smooth, 16 to 20 under the fourth toe. Tail 1½ to 1¾ times the length of head and body.

Pale brown or bronzy above, with black dots which are crowded to form a lateral band from the snout to the tail; a vertebral accumulation of dots sometimes also present; lips and flanks whitish or pinkish, dotted with black; lower surface whitish, throat often dotted with black.

From snout to vent 65 mm.; tail 110 mm.

Range. Burma, Siam, Annam and the Nakon Sritamarat Mountains in the Malay Peninsula.

Lygosoma quadrivittatum, Boulenger, p. 95.

Lygosoma surdum, Boulenger, p. 96.

Lygosoma cophias.

Boulenger, p. 96; M. A. Smith, Journ. F. M. S. Mus., X, 1922, p. 270 (Wray's Camp).

A second specimen obtained at Wray's Camp on Gunong Tahan, differs from the type in the following particulars:—

Distance between the end of the snout and fore-limb 1⅔ times in distance between the axilla and groin. A pair of enlarged preanals; 10 lamellae beneath the fourth toe.

From snout to vent 35 mm.; tail 50 mm.

Lygosoma quadrupes.

Anguis quadrupes, Linn., 1766, p. 390.
Lygosoma chalcides, Boulenger, p. 97.

Lygosoma larutense.

Boulenger, p. 97· M. A. Smith, Journ. F. M. S. Mus., X, 1922, p. 271 (Gunong Tahan).

A specimen obtained at Padang, Gunong Tahan has 28 scales round the body. In colour it is dark grey on the back and sides, yellowish-white below. The neck has three narrow, transverse, yellow bars, the back, six fine, longitudinal lines.

Lygosoma miodactylum, Boulenger, p. 98.

A legless scink, *Lygosoma anguinoides*, described by Boulenger in Journ. N.H.S. Siam, I, 1914, p. 67, has been found at Maprit and Klong Bang Lai just north of the Isthmus of Kra and may occur in the northern part of the Peninsula. In my reference to it in Vol. II, 1916, p. 158, twenty-two scales round the body should read twenty-four.

Genus **Dibamus**

Dibamus novae-guineae, Boulenger, p. 99.

Sub-order SERPENTES
OPHIDIA, p. 100.

Family **Typhlopidae**

Genus **Typhlops**

Typhlops lineatus, Boulenger, p. 102.

This species has not been found north of Bangnara, Patani.

Typhlops braminus, Boulenger, p. 103.

Typhlops albiceps, Boulenger, p. 103.

Typhlops bothriorhynchus, Boulenger, p. 104.

Typhlops diardi nigroalbus.

Typhlops nigroalbus, Boulenger, p. 104.

Typhlops diardi nigroalbus, M. A. Smith, Journ. N.H.S. Siam, VI, 1923, p. 52.

My reasons for making *T. nigroalbus* a race of *T. diardi* have already been stated (l.c.s.). All the specimens of *T. d. nigroalbus* which have been recorded from the Malay Peninsula, south of Patani, have 26 scales round the body. Examples from Bangnara, Patani have been obtained with only 24 scales round the body.

Typhlops mutilatus, Boulenger, p. 105.

Family **Boidae**

Genus **Python**

Python reticulatus, Boulenger, p. 107.

Python molurus, Boulenger, p. 108.

The occurrence of this species in the Malay Peninsula is still unproved. The reports of its presence are probably based on examples introduced by Indian snake-charmers.

Python curtus, Boulenger, p. 109.

Family **Ilysiidae**

Genus **Cylindrophis**

Cylindrophis rufus, Boulenger, p. 111.

Cylindrophis lineatus, Boulenger, p. 111.

Family **Xenopeltidae**

Genus **Xenopeltis**

Xenopeltis unicolor, Boulenger, p. 113.

Family **Colubridae**

Sub-family ACROCHORDINAE

Genus **Acrochordus**

Acrochordus javanicus, Boulenger, p. 115.

Genus **Chersydrus**

Chersydrus granulatus, Boulenger, p. 116.

Genus **Xenodermus**

Xenodermus javanicus, Boulenger, p. 117.

A specimen of this rare snake was obtained by Robinson and Kloss at Victoria Point in 1918. It has about 60 scales round the body, 170 ventrals and 120 subcaudals. It is a female. Colour, dark grey above, whitish below, the ventral shields grey at the margins.

Sub-family COLUBRINAE

Genus **Sibynophis**

Polyodontophis, p. 120.

Sibynophis, Fitzinger, Syst. Rept., p. 26, 1843, Stejneger, Proc. U. S. Nat. Mus , Vol. 38, p. 102 (1910).

Fitzinger's name of 1843 has precedence.

Sibynophis sagittarius is one of Cantor's records and is probably incorrect. The following characters will serve to distinguish the two species now definitely known to inhabit the Peninsula.

Parietal not in contact with the lower postocular: a black nuchal spot, bordered with yellow behind	*collaris.*
Parietal in contact with both postoculars; no nuchal spots	*geminatus.*

Sibynophis geminatus.

Polyodontophis geminatus, Boulenger, p. 120; M. A. Smith, Journ. N.H.S. Siam, II, 1916, p. 158 (Patani).

Sibynophis geminatus, Sworder, S'pore. Nat., 1922, p. 60 (Singapore).

This snake is common at Bangnara, Patani, but has not been met with farther north.

Sibynophis collaris.

Polyodontophis collaris, Boulenger, Cat. Sn. Brit. Mus., 1, p. 184 (1893); M. A. Smith, Journ. F. M. S. Mus., X, 1922, p. 265 (Guning Tahan).

Rostral twice as broad as high; suture between the internasals shorter than that between the prefrontals; frontal longer than its distance from the end of the snout, as long as or shorter than the parietals; loreal as long as high or a little longer; one pre-and two postoculars, the upper only in contact with the parietal; temporals 1+2 or 2+2; nine or ten supralabials, the fourth to sixth in contact with the eye; four infralabials in contact with the anterior pair of sublinguals which are about as long as the posterior.

Scales in 17 rows; ventrals 159 - 190; anal divided; subcaudals 100 - 131.

Brown above, the vertebral region greyish, usually with a series of small, round, black spots; head with dark spots or vermiculations and two transverse bars, one between the eyes and another across the occiput; a large black nuchal spot or band, bordered with yellow posteriorly; a black line along the side of the head above the light upper lip. Below yellowish, each ventral scale with an outer black spot or streak, which may be confluent on the posterior part of the body; ventrals anteriorly usually with median dots in addition.

Total length 760 mm.; tail 235 mm.

Range. The Himalayas (as far west as Simla) and the Indo-Chinese Peninsula. A specimen was obtained at Padang on Gunong Tahan in 1921. It is considerably darker in colour than examples found further north.

Genus **Xenochrophis**

Xenochrophis cerasogaster, Boulenger, p. 121.

Genus **Natrix**

Tropidonotus p. 122.

Natrix, Laurenti, Syn. Rept., p. 73 (1768).

Four species are added.

KEY TO THE SPECIES

I. Posterior maxillary teeth not abruptly enlarged.

Internasals much narrowed in front; nostrils directed upwards; 1 or 2 labials touching the eye; 2 superposed anterior temporals ...	*piscator*
Internasals narrowed anteriorly; nostrils superolateral; 3 labials touching the eye; 1 anterior temporal; subcaudals 120 - 126	*groundwateri.*
Internasals broadly truncate in front; nostrils lateral; 3 labials touching the eye; 2 superposed anterior temporals	*trianguligera.*
Internasals broadly truncate in front; nostrils lateral; 3 labials touching the eye; one anterior temporal; subcaudals 40 - 54 ...	*conspicillata.*
Internasals broadly truncate in front; nostrils lateral; two labials touching the eye; a single anterior temporal; subcaudals 96 - 103 ...	*inas.*

II. Last 2 or 3 maxillary teeth abruptly enlarged; scales in 19 rows.

A. Eye moderate or large; subcaudals 50 - 93.

Internasals much narrowed in front; a single anterior temporal; scales of outer row smooth; dorsum with 2 longitudinal yellow stripes ... ... *stolata.*

Internasals slightly narrowed in front; 2 superposed anterior temporals; scales of outer row smooth; labials white with (usually) a black spot below the eye; dorsum not barred or banded. ... ... *subminiata.*

Internasals broadly truncate in front; 2 superposed anterior temporals; all the scales strongly keeled; labials with black sutures; dorsum with short dark cross-bars or light spots ... ... *chrysarga.*

Internasals broadly truncate in front; usually a single anterior temporal; outer row of scales usually keeled; labials white with 2 oblique dark spots at the eye; dorsum with narrow black cross-bars ... ... *nigrocincta.*

B. Eye very large; subcaudals 95 - 113 ... *maculata.*

III. Last 2 or 3 maxillary teeth abruptly enlarged; scales in 17 rows ... ... *saravacensis.*

Natrix piscator.

Tropidonotus piscator, Boulenger, p. 123.

Natrix groundwateri.

M. A. Smith, Journ. N.H.S. Siam, IV, 1922, p. 205, pl. 8.

Maxillary teeth 30, the last two or three not abruptly enlarged. head distinct from neck; eye moderate; body slender. Rostral much broader than high; internasals narrowed anteriorly, as long as the prefrontals; nostrils superolateral between two nasals; frontal a little longer than broad, as long as its distance from the end of the snout, much shorter than the parietals; loreal twice as long as high; two pre- and two or three postoculars; temporals 1+2; nine supralabials, the fourth to sixth touching the eye; five infralabials in contact with the anterior pair of sublinguals, which are as long as the posterior pair.

Scales in 19 rows at the middle of the body, reduced to 17 immediately afterwards, smooth anteriorly, feebly keeled posteriorly. Ventrals 147 - 154; anal single; subcaudals 120 - 126.

Black above with a dorso-lateral chain of yellow spots; scale-rows 1 and 2 with yellow centres; labials yellow with black sutures and a yellow streak from the angle of the mouth to the nape. Below yellowish, with a black spot at the outer edge of each ventral and subcaudal shield.

Total length 450 mm.; tail 165 mm.

Still known only from the type locality Tasan, near Chumporn.

The precise status of this snake is still undetermined, as it has not been possible to make a complete examination of the maxillary teeth. It is provisionally placed under *Natrix* as in all other characters it agrees with that genus.

Natrix trianguligera.

Tropidono'us trianguligerus, Boulenger, p. 125.

Natrix trianguligera, M. A. Smith, Journ. N.H.S. Siam, II, 1916, p. 159 (P. Siam); Sworder, S'pore. Nat., 1922, p. 61.

I have seen a specimen from the Nakon Sritamarat district. Wall records it from the Thayetmyo district, Burma, (Journ. Bombay, N.H.S., XXXI, 1926, p. 560).

Natrix inas.

Tropidonotus inas, Boulenger, p. 125; M. A. Smith, Journ. N.H.S. Siam, II, 1916, p. 159.

I obtained a second specimen of this snake in the Nakon Sritamarat mountains in 1916, V. 148, C. 103.

Total length 380 mm.; tail 120 mm.

Natrix conspicillata.

Tropidonotus conspicillatus, De Rooij, Rept. Indo-Austral. Archipel., II, 1917, p. 83; Boden Kloss, Journ. F. M. S. Mus., VI, 1915, p. 41.

Eye moderate; nasal entire or partly divided; rostral scarcely visible above; internasals broadly truncate anteriorly, about as long as the prefrontals; frontal longer than its distance from the tip of the snout, shorter than the parietals; loreal higher than long; one pre- and three postoculars; temporals 1 + 2 or 3; eight supralabials. the third to fifth touching the eye; four or five lower labials in contact with the anterior pair of sublinguals, which are shorter than the posterior pair. Scales in 19 rows, all keeled except the outer row. Ventrals 138 to 153; anal divided; subcaudals 40 - 54.

Brown or reddish-brown above, with a dark network and two longitudinal series of yellow spots or transverse lines; head brown with or without small, yellow, dark-edged spots; a yellow, black-edged streak on the upper lip, another from the eye to the corner of the mouth; nape dark, usually with two interrupted yellow transverse streaks. Lower surface yellow, uniform or dotted with brown.

Total length 400 mm.; tail 75 mm.

Kloss records a specimen obtained at Genting Sempah, Selangor-Pahang boundary (alt. 2,000 ft.). The species is otherwise known from Sumatra, Borneo and the Natuna Islands.

Natrix stolata.

Tropidonotus stolatus, Boulenger, p. 125.

Natrix subminiata.

Tropidonotus subminiatus, Boulenger, p. 126.

Natrix subminiata, Sworder, S'pore. Nat., No. 3, 1924, p. 21 (Singapore).

Natrix chrysarga.

Tropidonotus chrysargus, Boulenger, p. 127; M. A. Smith, Journ. F. M. S. Mus., X, 1922, p. 265 (Pahang Mts.).

In addition to the localities mentioned by Boulenger this snake has been obtained on Gunong Tahan, Bukit Fraser, at Koh Rah and in the Nakon Sritamarat mountains.

Natrix nigrocincta.

Tropidonotus nigrocinctus, Boulenger, Fauna Brit. Ind., p. 346 (1890).

Natrix nigrocinctus, M. A. Smith, Journ. N.H.S. Siam, IV, 1922, p. 206.

Eye rather large, its diameter greater than its distance from the nostril; rostral visible from above; internasals truncate anteriorly, shorter than the prefrontals; frontal longer than its distance from the end of the snout, shorter than the parietals; loreal a little longer than high; one or two preoculars and three or four postoculars; temporals 1+2 or 2+2; nine, rarely eight, supralabials the fourth, fifth and sixth touching the eye; five infralabials in contact with the anterior pair of sublinguals, which are shorter than the posterior pair.

Scales in 19 rows, the outer row keeled or smooth. Ventrals 150-157; anal divided; subcaudals 72-82.

Greyish or green above, green towards the head, with narrow transverse black bars which may be interrupted on the vertebral line; an oblique black streak below the eye, another behind the eye and a third on the side of the neck; lower parts yellowish, speckled with grey or brown or almost entirely grey.

Total length 400 mm.; tail 180 mm.

Specimens were obtained by Robinson and Kloss at Tasan, Tapli and Chumporn (Isthmus of Kra). The description here given applies to Peninsula examples only. A more detailed account of the forms found farther north has been given by me in Journ. N.S.H. Siam, IV, 1922 p. 207.

Natrix maculata.

Tropidonotus maculatus, Boulenger, p. 128.

Natrix maculata, Sworder, S'pore. Nat., July 1922, p. 61 (Singapore).

Natrix saravacensis.

Tropidonotus saravacensis, De Rooij, Rept. Indo-Austral. Archipel., II, 1917, p. 85; Kloss, Journ. F. M. S. Mus., VI, 1915, p. 42.

Head distinct from neck, eye large; rostral not or just visible from above; internasals truncate anteriorly, as long as or slightly shorter than the prefrontals; frontal longer than its distance from the end of the snout, shorter than the parietals; loreal higher than long; one pre- and three postoculars; temporals 2+2 or 2+3; eight supralabials, the third to fifth touching the eye; five or six infralabials in contact with the anterior pair of sublinguals which are shorter than the posterior pair..

Scales in 17 rows, all strongly keeled; ventrals 136-154; anal divided; subcaudals 52-89.

Olive-brown above, with a series of dark, transverse bars, and two series of yellow spots or yellow stripes; or blackish above with orange spots anteriorly; head vermiculated with black; lips with black sutures. Below chequered with black and yellow, the black sometimes predominating.

Total length 560 mm.; tail 160 mm.

Recorded by Kloss from Mount Menuang Gasing, Selangor-Pahang boundary. A second specimen has been recently obtained at Tanah Rata in the Cameron's Highlands by Mr. Wilkins of the F. M. S. Agricultural Department, and is now in Raffles Museum. It is a male, and differs from other specimens recorded in having only 7 supralabials, due to fusion of the fourth and fifth shields, and in having only a single anterior temporal on the right side. Ventrals 141, caudals 75. The species is otherwise known from Borneo.

Genus **Macropisthodon**

Macropisthodon flaviceps.

Boulenger, p. 128; M. A. Smith, Journ. F. M. S. Mus., X, 1922, p. 266 (Kuala Tahan).

I have examined a specimen from the hills near Bandon, which appears to be the farthest record north.

Macropisthodon rhodomelas.

Boulenger, p. 129; M. A. Smith, Journ. N.H.S. Siam, II, 1916, p. 160 (Nakon Sritamarat) and Journ. F. M. S. Mus., X, 1922, p. 265 (Gunong Tahan); Sworder, S'pore. Nat., No. 2, 1922, p. 63 (Singapore).

Nakon Sritamarat is the most northerly record of this species.

Genus **Helicops**

Helicops schistosus., Boulenger, p. 130.

Genus **Lycodon**

Lycodon aulicus.

Boulenger, p. 131; Sworder, S'pore. Nat., No. 2, 1922, p. 63 (Singapore); M. A. Smith, P.Z.S., 1927, p. 221.

Lycodon laoensis.

Boulenger, p. 132; M. A. Smith, Journ. N.H.S. Siam, II, 1916, p. 160.

Specimens of this snake have been obtained at Bangnara, Patani, and in the Nakon Sritamarat mountains.

Lycodon effrenis, Boulenger, p. 132.

Lycodon butleri, Boulenger, p. 133.

Lycodon subcinctus.

Boulenger, p. 133; M. A. Smith, Journ. N.H.S. Siam, II, 1916, p. 160 (Patani); Sworder, S'pore. Nat., No. 2, 1922, p. 62 (Singapore).

This snake has been found widely distributed over the Indo-Chinese peninsula, ranging north as far as Hainan. A specimen was obtained by the F. M. S. Museums on Gunong Tahan at 5,400 feet altitude. The temporal shields are 2+2 and five infralabials are in contact with the anterior sublinguals.

Genus **Dryocalamus**

The Indo-Chinese *D. davisonii* Blanford, has been found just north of the Isthmus of Kra and will probably be found in the region included in this work.

Dryocalamus subannulatus, Boulenger, p. 134.

Genus **Zaocys**

Zaocys, Boulenger, p. 135.

Ptyas (in part), Wall, Journ. Bombay, N.H.S. XXIX, 1923, p. 617.

Zaocys carinatus.

Boulenger, p. 135; M. A. Smith, Journ. N.H.S. Siam, II, 1916, p. 160 (Patani, Nakon Sritamarat Mts.); Sworder, S'pore. Nat., No. 2, 1922, p. 62 (Singapore).

The range of the species extends to Tavoy and northern Siam.

Zaocys fuscus.

Boulenger, p. 136; Sworder, S'pore. Nat., 1922, No. 2, p. 162 (Singapore).

Sworder records a specimen recently killed in Singapore.

Genus **Ptyas**

Zamenis, (in part), p. 136.

Ptyas, Fitzinger, Syst. Rept., p. 26 (1843); Günther, Rept. Brit. Ind., p. 248 (1864); Stejneger, Herpet. Japan. p. 345 (1907); (in part), Wall, Journ. Bombay, N.H.S. XXIX, 1923, p. 617.

The genus *Ptyas* has been separated from *Coluber* (the *Zamenis* of Boulenger) in having two or three loreal scales instead of a single shield. It contains two species only, namely *P. mucosus* and *P. korros*. *Z. fasciolatus* (p. 138) mentioned by Boulenger, need not be considered here. It is a native of India and the specimen recorded by Cantor from Province Wellesley was almost certainly never obtained there. (*See* also Wall in Journ. Bombay N.H.S., XXIX, 1923, p. 619).

On the grounds that *Coluber mucosus* Linn., has the characters generally associated with *Zaocys* (dorsal scales in regular rows) and is the type of the genus *Ptyas*, Wall has sunk *Zaocys* Cope, 1860, in favour of *Ptyas* Fitzinger, 1843. Although many specimens of *mucosus* have the scales in regular rows on the middle and posterior part of the body the character is not constant, nor does it occur throughout the whole of the body as in *Zaocys*. I prefer to retain *C. mucosus* under *Ptyas*, regarding it as a species connecting that genus with *Zaocys*.

Ptyas korros.

Zamenis korros, Boulenger, p. 137.

Ptyas korros, M. A. Smith, Journ. N.H.S. Siam, II, 1916, p. 160 (Patani and Nakon Sritamarat); Sworder, S'pore. Nat., No. 2, 1922, p. 62.

Sworder records it as common on Singapore Island. I have examined specimens from Bangnara, Patani and Nakon Sritamarat, and Robinson and Kloss obtained a specimen at Tapli (Isthmus of Kra).

Ptyas mucosus.

Zamenis mucosus, Boulenger, p. 137.

Genus **Xenelaphis**

Xenelaphis hexagonotus, Boulenger, p. 139.

Genus **Elaphe**

Coluber, p. 139.

Elaphe, Fitzinger, in Wagler's Desc. et Icon. Amphib. pt. III, pl. XXVII and text, 1833 (type *E. parreysii* Fitz=*Coluber quatuorlineatus* Lacepède); Stejneger, Herpet. Japan, p. 307 (1907).

One species, *E. prasina* is to be added. It can be distinguished from the other species in the Peninsula with 19 scale-rows by its bright green coloration.

Elaphe porphyracea.

Coluber porphyraceus, Boulenger, p. 140.

An example has recently been obtained on Cameron's Highlands, 4,500 ft., by Commander Buddle, R. N. The evidence for its existence in the Malay Peninsula previously rested upon Cantor's specimen of *Psammophis nigrofasciatus* which was said to have been obtained in Singapore. Apart from the unreliability of many of Cantor's records the species is a mountain form and has been found so far only at high altitudes. The record from Sumatra. (Hubrecht, in Snelleman, Nat. Hist. Midden-Sumatra, Rept., 1887, p. 5, pl. —), however, appears to be a very definite one. The most southerly record of its occurrence hitherto on the Asiatic mainland that I know of is a specimen captured on Doi Suthep (N. Siam) by Dr. W. E. Barnes of the Rockfeller Institute, Bangkok.

Elaphe flavolineata.

Coluber melanurus (non Shaw. 1802), Boulenger. p. 141; M. A. Smith, Journ. N.H.S. Siam, II, 1916, p. 160 (Patani).

Elaphe melanurus, Sworder, S'pore. Nat., No. 2, 1922, p. 63 (Singapore).

Coluber flavolineata Reinwardt, Bull. Sci., IX, 1826, p. 237 (nom. nud.), Schlegel, Des Serpens, II, 1837, p. 141.

I have already (1916) commented on the distribution of this snake on the Asiatic mainland. Wall records it from Tenasserim (Journ. Bombay N.H.S., XXIX, 1923, p. 621) and this appears to be the most northerly record that is authentic.

Elaphe radiata.

Coluber radiatus, Boulenger, p. 141.

Elaphe prasina.

Coluber prasinus, Boulenger, Cat. Sn. Brit. Mus., II, p. 59 (1894); M. A. Smith, Journ. F. M. S. Mus., X, 1922, p. 266 (Gunong Tahan).

Maxillary teeth 20 to 22; eye moderate. Rostral broader than high, visible from above; internasals considerably smaller than the prefrontals; frontal longer than broad, as long as its distance from the rostral or the end of the snout, shorter than the parietals; loreal longer than high; one preocular (rarely divided) in contact with or separated from the frontal; two postoculars; temporals 2+2, rarely 1+2; nine, sometimes eight, supralabials, the fourth, fifth and sixth or fourth and fifth only touching the eye; five infralabials in contact with the anterior pair of sublinguals which are about as long as the posterior pair.

Scales in 19 rows; the dorsals feebly keeled in the adult, smooth in the young. Ventrals angulate laterally, 198 - 207; anal divided (rarely entire); subcaudals 91 to 107.

Uniform bright green above, the interstitial skin with black and white reticulations; upper lip and lower parts yellowish or greenish white; sometimes a white line along the outer margin of the ventrals.

Total length 1140 mm.; tail 275 mm.

Range. From the Eastern Himalayas to Tonkin and the Malay Peninsula. A specimen was obtained by an F. M. S. Museums expedition on Gunong Tahan.

Elaphe taeniura grabowskyi

Elaphis grabowskyi, Fischer, Arch. fur Natur., 1885, p. 59, pl. IV, fig. 3.

Coluber taeniurus, Boulenger, p. 142.

Elaphe taeniurus, Stejneger, Herpet. Japan, p. 319 (1907).

Elaphe taeniura, Sworder, S'pore. Nat., No. 2, 1922, p. 63.

Coluber taeniurus var. *ridleyi*, Butler, Journ. Bombay N.H.S., XII, 1899, p. 426.

As pointed out by Stejneger (1907) several forms of this snake can be defined when it is considered over its whole range. The typical form from the Himalayas and China has 23 or 25 scale rows, 226 to 258 ventrals and 90 to 114 subcaudals. A southern form ranging through Siam, the Malay Peninsula and Archipelago has an average of more scale-rows and has more ventrals. The following table of variation is drawn up from the material available to me, but the series is too small except for that from the Malay Peninsula to draw definite conclusions.

Region	*Scale-rows*	*Ventrals*	*Sub-caudals*	*No. examined*
Siam	25	276 - 290	91 - 103	3
Malay Peninsula ...	25	288 - 305	102 - 112	12
Malay Archipelago ...	25 - 27	278 - 284	94 - 98	4

For the present I name them all *E. t. grabowskyi* (type locality Borneo) although a bigger series from the Malay Archipelago may shew that the Peninsular form can be separated, in which case *ridleyi* would stand for the latter.

The specimen referred to by Sworder (1922) appears to belong to the typical form. It has 23 scale-rows, 230 ventrals and 112 subcaudals.

LIST OF SPECIMENS EXAMINED.

			Sc. rows	*Vents.*	*Caud.*
B.M. 97. 5. 10. 1 – 3		Caves, Kuala Lumpor.	♂ 25.	299	108
			♂ 25.	288	?
			♀ 25	291	102
B.M. 1903. 4. 13. 72		Batu Caves	♀ 25.	289	106
B.M. 1906. 2. 28 21		K. Teku, Pahang, juv.	25	305	108
B.M. 97. 12. 28. 51		Johore Bahru.	♀ 25	293	105
Raffles Mus.	1	Batu Caves.	25	295	96 (impf.)
	2		25	291	?
	3		25	294	112
	4		25	296	108
	5	Johore	25	305	102
	*6	Kedah Peak 3,300′	25	305	110
B.M. 86. 5. 15. 20. 22		S. E. Borneo (types of *grabowskyi*)	♂ 25	282	94
			♂ 25	278	98
B.M. 79. 7. 2. 3		Pajo, Sumatra	25	282	97
B.M. 1915. 12. 2. 35		Korinchi, Sumatra, juv.	27	284	97

Elaphe oxycephala.

Coluber oxycephalus, Boulenger, p. 143; M. A. Smith, Journ. F. M. S. Mus., X, 1922, p. 266 (Kuala Tahan).

Gonyosoma oxycephala, Sworder, S'pore. Nat., No. 2, 1922, p. 64 (Singapore).

Coluber floweri Werner, SB. Ak. Wiss. Wien, Abt. 1, Band 134, 1925, p. 55; M. A. Smith, Ann. Mag. Nat. Hist., (10) I, 1928, p. 497 (*floweri = oxycephala*).

I have examined a specimen from Bangnara, Patani. The range of the species extends into Annam (Langbian plateau).

Coluber floweri Werner, I regard as a colour-form of *E. oxycephala.* In addition to the type in the Natural History Museum, Vienna, there are four more specimens in the British Museum. This variety is never green, but has the head and body above of a light or dark buff colour and is marked all over with scattered, irregular blotches of dark brown or black. The belly is whitish, uniform, or with dark markings similar to those upon the upper parts. The tail which is paler in colour and has no dark markings at all, is abruptly marked off from the body coloration as in the typical form.

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*This specimen was taken on Kedah Peak, at 3,300 ft., by Mr. H. M. Pendlebury on 13th March, 1928.

Hewitt (J. Straits Br. Asiat. Soc., 1906, p. 282) records a specimen (presumably from Borneo), of a uniform brownish colour dorsally, pale yellowish ventrally. It appears to be the same form without any dark markings.

SPECIMENS OF COLOUR-VAR. *floweri* EXAMINED.

Museum.	*Locality.*	*Sex*	*Sc. rows.*	*Vents.*	*Cauds.*
Vienna (type) ...	Singapore.		25	246	147
B.M. 1906. 7.18.1 ...	Kuala Kelantan.	♂	25	238	134
B.M. 1902. 12.12.24 ...	Trang, S. Siam.	♂	25	237	120 (impf.)
B.M. 1903. 6.13.1 ...	Dindings.	♂	25	247	136
B.M. (Gen. Hardwicke d.)	?	♂	23	238	139

Genus **Gonyophis**

Gonyophis margaritatus, Boulenger, p. 144.

Genus **Ahaetulla**

Ahaetulla (part.) Gray, Ann. Philos., 1825. X, p. 208.

Dendrophis (part.) Boie. Isis, 1827, pp. 520, 541; Boulenger, p. 145.

Ahaetulla has priority over *Dendrophis* and there appears to be no reason why it should not be used. Moreover as the type of *Dendrophis* is specifically named by Boie as *Coluber ahaetulla* Linn.. =*Leptophis liocercus* Wied=*Leptophis ahaetulla* Linn., (see Andersson, Bihang K. Sv. Vet. Akad. Handl. Stockholm, 1899, Bd. 24, Afd. 4, No. 6, p. 22), *Dendrophis* cannot be used for the genus now under consideration. The type of *Ahaetulla* will be *Coluber decorus* Shaw=*Coluber pictus* Gmelin.

Ahaetulla picta.

Dendrophis pictus, Boulenger, p. 145; Sworder, S'pore. Nat., No. 2, 1922, p. 64 (Singapore); M. A. Smith, J. F. M. S. Mus., X, 1922, p. 266 (Kuala Teku).

Coluber pictus Gmelin was published in 1789 and not 1788 as stated. In the same year appeared Lacepede's *Coluber boiga* (Hist. Nat. Serp., II, p. 223, pl. 9) which appears to be identical with *pictus*. As there appears no means of ascertaining which name has priority I have retained the one which has been in general use for the last 100 years.

Ahaetulla formosa.

Dendrophis formosus Boulenger, p. 146; M. A. Smith, Journ. N.H.S. Siam II, 1916, p. 161 (Patani); Swerder, S'pore. Nat., No. 2, 1922, p. 64 (Singapore).

Mr. C. J. Aagaard obtained a specimen at Bangnara in Patani, and I have seen another from Benang Star in the same State. The species is widely distributed in Siam.

Genus **Dendrelaphis**

One species, *D. subocularis*, is added. It can be distinguished from *D. caudolineatus* by having only 15 scale-rows.

Dendrelaphis caudolineatus.

Boulenger, p. 147; M. A. Smith, Journ. N.H.S. Siam, II, 1916, p. 161 (Patani); Sworder, S'pore. Nat., No. 2 1922, p. 64 (S'pore).

As already stated (1916) there is no evidence to shew that this species occurs outside the Malayan area. Robinson and Kloss obtained a specimen at Klong Wan, Tapli (Isthmus of Kra), north of which locality it has not been found.

Dendrelaphis subocularis.

Boulenger, Cat. Sn. Brit. Mus, II, p. 89 (1894).

Eye as long as its distance from the nostril. Rostral broader than high, visible from above; internasals nearly as long as the prefrontals; frontal longer than broad, longer than its distance from the end of the snout, a little shorter than the parietals; loreal elongate; 1 pre- and 2 postoculars; temporals 2+2; 7 or 8 supralabials, the fourth or fifth very large and bordering the eye; 4 or 5 infralabials in contact with the anterior pair of sublinguals, which are much longer than the posterior pair. Scales in 15 rows; ventrals 150 - 172; anal divided; subcaudals 74 - 105.

Bronze-brown above, the colour extending to and including the outer margin of the ventral shields but interrupted by a light lateral streak on the inner half of scale-row 1 and outer half of scale-row 2. A black line behind the eye continued (in the young) on to the nape as a series of black spots or short transverse bars. Lips yellow with black sutures. Below pearly-white; subcaudals metallic citrine.

Total length 845 mm.; tail 235 mm.

Range. The types are from Bhamo, Upper Burma and the species is widely distributed throughout Siam. Robinson and Kloss obtained a specimen at Tasan (Isthmus of Kra).

Genus Oligodon

Simotes, p. 147.

Oligodon Boie, Isis, 1827, p. 519.

Holarchus (part), Stejneger, Herpet. Japan, p. 353 (1907).

Oligodon Wall, Rec. Ind. Mus., XXV, 1923, p. 305.

As suggested by Gunther and Boulenger and shewn in greater detail by Wall, there is no clear line of demarcation between *Oligodon* and *Holarchus* (=*Simotes*, preoccupied), the former being characterized by fewer teeth and, usually, a reduction in the number of scale-rows.

Oligodon purpurascens.

Simotes purpurascens, Boulenger, p. 148; M. A. Smith, Journ. N.H.S. Siam, II, 1916, p. 161.

Holarchus purpurascens, Sworder, S'pore. Nat., nos. 3 and 4, 1922, p. 21 (Singapore).

Holarchus cyclurus, Sworder, S'pore. Nat., nos. 3 and 4, 1922, p. 21,

Oligodon purpurascens, Wall, Rec. Ind. Mus., XXV, 1923, p. 328.

Wall is probably correct in making *O. cyclurus* a sub-species of *O. purpurascens*, but there are more differences between them than he makes out. The normal scale formula for *O. purpurascens* (type locality Java) which ranges throughout the Malay Peninsula and Archipelago is 19.19.17 or 15 (counting the scale-rows at the neck, the middle of the body and before the vent respectively). Occasional individuals have 20 or 21 scales on the middle of the body, but they are rare. This form inhabits the Peninsula as far north as Patani, but north of this locality and for a distance of nearly 300 miles, there is a region in which no species of the genus has yet been obtained. At Bangtaphan (Lat. 11′ 15° N.) a snake is to be found resembling *purpurascens*, except that it has a scale formula of 21. 21. 19 or 17, and this form—the *Simotes cyclurus* (in part) of Boulenger—ranges over the whole of Siam, its scale-formula being the same throughout the country. Further north still, in Burma, it again reverts to the scale formula of 19. 19. 17 or 15 and although its coloration there is somewhat different, it would be difficult at times to distinguish between Burmese examples and those found in the Malay Peninsula.

Oligodon purpurascens (*forma typica*), therefore, should be the name for the form found in the Malay Peninsula and Archipelago, and *O. purpurascens cyclurus**, has no place in the peninsular fauna at all. The types of *Simotes catenifer* Stoliczka, upon which Boulenger bases his record of *cyclurus*, came from Penang and

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*The type of *Coronella cyclura* Cantor is lost, but a coloured drawing of the snake, signed by Cantor, is in the Bodleian Museum, Oxford. It is No. 15 of the series. Gunther (Rept. Brit. Ind., p. 218) has doubted if this drawing represents a species of *Oligodon* at all, but it appears to me to be a good illustration of one colour-form of *O. p. cyclurus*

Johore respectively, and according to the original description they have 19 scale-rows at midbody and agree in other characters with the Malayan form. *S. catenifer* was originally placed by Boulenger in the synonymy of *purpurascens* (Cat. Sn. Brit. Mus., II, p. 218 (1894)) and I do not know his reason for placing it later under *cyclurus*.

LIST OF SPECIMENS OF *O. purpurascens* EXAMINED.

Malay Peninsula

		Scale-rows.	*Vents.*	*Caudals.*
Smith, coll. Bangnara, Patani.	♀	19. 19. 15	192	55
	♀	19. 19. 17	180	53
	♀	19. 19. 15	187	53
	♂	19. 19. 15	175	60
F. M. S. Mus., Perhentian Is., Trengganu	♂	19. 19. 15	181	52
B.M. 1908, 7. 8. 1., Kelantan ...	♀	21. 21. 17	191	57
B.M. 1906, 7. 18. 3., ,, ...	♀	19. 19. 17	190	55
B.M. 1909, 2. 27. 5., ,, ...	juv.	19. 19. 15	179	57
B.M. 98. 9. 22. 33-4, Penang ...	♂	19. 19. 15	179	54
	♂	19. 19. 15	177	56
B.M. 63. 3. 19.1019, ,, ...	♀	19. 21. 17	190	53
B.M. 96. 6. 25. 43, P. Wellesley	♂	19. 19. 15	180	56
F. M. S. Mus., Ayer Itam, Selangor	♀	19. 19. 15	184	?
F. M. S. Mus., Jelebu, N. Sembilan	♂	19. 19. 15	182	56
B.M. 83. 11. 28. 13, Singapore.		19. 20. 17	186	54
Raffles Mus., Singapore ...	♀	19. 21. 15	185	52
Raffles Mus., Sungei Dohol, Johore	♀	19. 21. 17	183	55
Raffles Mus., Tebrau, Johore.	♀	19. 19. 15	186	54
Raffles Mus., Kuala Lumpur.	juv.	19. 19. 15	188	58
Raffles Mus., Kuala Lumpur.	♀	19. 21. 15	183	?
Raffles Mus., Pulau Gallang, Rhio Archipelago ...	♂	19. 19. 17	173	53

Borneo

		Scale-rows.	Vents.	Caudals.
B.M. 1904, 7. 2. 3, Sarawak ...	♀	19. 19. 17	173	48
B.M. 64. 7. 5. 10, Borneo (type of *S. labuensis*) ...	♂	19. 21. 15	171	?
B.M. 1911, 1. 30. 21, Sarawak	♂	19. 19. 15	164	51
B.M. 1910, 1. 12. 14, Barito R., Borneo	♂	19. 19. 15	170	49
B.M. 96. 4. 28. 8, Kina Balu ...	♂	19. 19. 15	168	46
B.M. 72. 2. 19. 47, Matang ...	♂	19. 19. 15	169	51

Sumatra

B.M. 1920. 1. 16. 20. Bencoolen	♀	19. 19. 15	176	43
B.M. 89. 11. 12. 2, Deli ...	♂	19. 21. 15	165	53
B.M. 89. 12. 26. 8 ,, ...	?	19. 21. 15	166	53
B.M. 84. 1. 8. 40, Nias ...	♂	17. 19. 15	170	?
B.M. 85. 5. 4. 6, ,, ...	♀	19. 19. 15	174	52

An analysis of the above material shews that the form from the Malay Archipelago has fewer ventrals and subcaudals and fewer and broader dorsal spots than the one from the Malay Peninsula, so that if one cares to split further the name for the form in the Peninsula will be *catenifer*.

Malay Archipelago.

♂ Ventrals 164 to 171; subcaudals 46 to 53.

♀ Ventrals 173 to 176; subcaudals 43 to 52.

9 to 11 spots on the body and 3 or 4 on the tail (***purpurascens***).

Malay Peninsula.

♂ Ventrals 175 to 180; subcaudals 54 to 60.

♀ Ventrals 180 to 192; subcaudals 53 to 57.

11 to 13 spots on the body and 4 or 5 on the tail (***catenifer***).

Oligodon octolineatus.

Simotes octolineatus, Boulenger, p. 149.

Holarchus octolineatus, Sworder, S'pore. Nat., nos. 3 and 4, 1922, p. 64 (Singapore).

The record of this snake in southern India is no doubt incorrect.

Oligodon signatus.

Simotes signatus, Boulenger, p. 150.

Holarchus signatus, Sworder, S'pore. Nat., No. 2, 1922, p. 64 (Singapore).

Oligodon cruentatus.

Simotes cruentatus, Boulenger, p. 150.

There is a specimen of unknown origin in the Selangor Museum.

Genus **Gongylosoma**

Ablabes, p. 151.

Gongylosoma Fitzinger, Syst. Rept., 1843, p. 25; Stejneger, Meddel. Zool. Mus., Kristiania, No. 2, 1914, p. 2.

One species, *G. scriptum*, is added.

Key to the species

Scales in 15 rows ... ... *tricolor.*
Scales in 13 rows ... ...
  Ventrals 115 - 137; subcaudals 58 - 75; 7 supralabials ... ... *baliodeirum.*
  Ventrals 117 - 145; subcaudals 89 - 96; 8 supralabials; a narrow white collar succeeded by a dark patch (present or absent) *scriptum.*
  Ventrals 110 - 122; subcaudals 77 - 103; a light V-shaped mark on the neck and three light lines anteriorly ... ... *longicauda.*

Gongylosoma tricolor.

Ablabes tricolor, Boulenger, p. 151.

Gongylosoma tricolor, Sworder, S'pore. Nat., No. 2, 1922, p. 64 (Singapore)

Gongylosoma baliodeirum.

Ablabes baliodirus, Boulenger, p. 152.

Gongylosoma baliodeirum, Sworder, S'pore. Nat., No. 2, 1922, p. 65 and no. 3, 1921, p. 22 (Singapore).

Gongylosoma scriptum.

Ablabes scriptus, Theobald, Journ. Linn. Soc. X, 1868, p. 42; Boulenger, Cat. Sn. Brit. Mus., II, p. 284 (1894).

Rostral broader than high, visible above; nasal divided; diameter of the eye three-fourths the length of the snout; internasals shorter than the prefrontals; frontal longer than its distance from the end of the snout, shorter than the parietals; loreal very small, sometimes absent; 1 pre- and 2 postoculars; temporals 1+2, the anterior in contact with both postoculars; 8 supralabials, the third to fifth touching the eye, the seventh very long, as long as the anterior temporal; 7 or 8 infralabials, the first 4 in contact with the anterior pair of sublinguals which are shorter than the posterior pair.

Scales in 13 rows. **Ventrals** 117 - 145; anal divided; subcaudals 89 - 96.

Light brown above, with or without black dots on either side of the vertebral line in its anterior part; a black mark under the eye present or absent, followed by a white upright border involving the postoculars and a black patch behind it; a dark patch on the nape (present or absent) bordered in front and behind with white. Below white.

Total length 500 mm.; tail 175 mm.

In scale characters this species agrees almost exactly with *G. longicauda*, but the markings are different. At present only 4 specimens are known, namely the type from Martaban, Burma, one obtained by me in the Petchaburi district of Siam, a third collected by Robinson and Kloss at Telok Poh, Pulau Panjang, I. of Puket and a fourth by Dr. Hugh Smith on Khao Luang in the Nakon Sritamarat mountains. Further material may shew that it is only a race of *longicauda*. For the present I leave it distinct.

Gongylosoma longicauda.

Ablabes longicauda, Boulenger, p. 152.

Genus **Macrocalamus**

Macrocalamus lateralis.

Boulenger, p. 153; M. A. Smith, Journ. F. M. S. Mus., X, 1922, p. 266 (Gunong Tahan).

An example of this rare snake was captured at Padang, Gunong Tahan. The ventral count was 127 (not 172 as printed l.c.s. 1922).

Colour. Dark brownish above; a dark band from the eye to the last labial bordered above with yellow; two indistinct yellow V-shaped marks on the neck; labials yellow. Below yellow, spotted with black; a black line at the outer margin of the ventrals and a median one below the tail.

Genus **Pseudorabdion**
Pseudorhabdium, p. 154.

Pseudorabdion, Jan, Arch. Zool. Anat. Fis., Genova, II. 1862, p. 10.

Pseudorabdion longiceps.

Pseudorhabdium longiceps, Boulenger, p. 154; Sworder, S'pore. Nat., No. 2, 1922, p. 65 (S'pore.); M. A. Smith, Journ. N.H.S. Siam, II, 1916, p. 161 (Patani) and Journ. F. M. S. Mus., X, 1922, p. 267 (Fraser's Hill).

Sworder states it is common on Singapore Island. Mr.Aagaard also tells me it is common at Bangnara, Patani; it has not been recorded north of this locality.

Sworder records the sexual variation of this snake.

Genus Calamaria

One species *C. javanica* is added which, together with *Calamaria gimletti* which was inadvertently omitted from the key, must now be included. Both belong to the second part of Boulenger's synopsis.

II. Four upper labials, second and third touching the eye.
  A preocular ... ... *pavimentata.*
  No preocular—
    Ventrals 158 - 187 ... ... *javanica.*
    Ventrals 202 - 249 ... ... *gimletti.*

Calamaria vermiformis.

Boulenger, p. 155; M. A. Smith, Journ. N.H.S. Siam, II, 1916, p. 162.

Not recorded north of Patani.

Calamaria albiventer, Boulenger, p. 156.

Calamaria sumatrana.

Boulenger, p. 156; Sworder, S'pore. Nat., No. 2, 1922, p. 65.

The specimen in the Indian Museum (no. 13306) labelled Singapore, presented by Raffles Museum, appears to be the only record of this snake in the Malay Peninsula.

Calamaria leucocephala.

Calamaria leucocephala, Boulenger, p. 157; Sworder, S'pore. Nat., 1922, p. 65 (Singapore).

Calamaria agamensis Bleeker, Nat. Tijdschr. Ned. Ind., 1860, XXI, p. 292.

Sworder records the colour in life of two specimens obtained at Bukit Timah, Singapore, as "very dark blue above, white below, head coral pink".

Calamaria agamensis Bleeker, must now be regarded as identical with this species. It is clearly shewn by six specimens collected by Mr. E. Jacobson at Fort de Kock, central Sumatra, and presented recently by him to the British Museum of Natural History.

The characters separating *leucocephala* from *agamensis* are a preocular shield and a completely or partially white or pale head (pink in life). Out of 20 specimens of *leucocephala* in the British Museum collection, only 2 (from Singapore and Penang) have an all white head. In the remainder the white is confined to the posterior part of the head or is absent altogether, the top of the head being of the same colour as the upper part of the body. Mr. Jacobson's specimens shew a variable amount of colouring, the posterior portion of the head being more or less pale in all of them. In his series the preocular is absent in two specimens, present on both sides in two and present on one side only in the remaining two.

The variation in the ventral and subcaudal count in this species is very small if the sexes are considered apart, as is usual with *Calamaria.* The following are the counts of the Fort de Kock examples:—

	Vents.	*Cauds.*		*Vents.*	*Cauds.*
♂	127	27	♀	152	21
♂	133	24 ?	♀	152	21
♂	138	29			
♂	142	28			

Calamaria pavimentata.

Boulenger, p. 157; M. A. Smith, Journ. F. M. S. Mus., X, 1922, p. 267 (Gunong Tahan).

Calamaria gimletti.

Boulenger, p. 220; Sworder, S'pore. Nat. No. 5, 1925, p. 100 (Johore).

Sworder records a third example of this rare snake captured on Gunong Pulai, Johore. It has 249 ventral shields*.

Boulenger omits to record that the type-specimen had a total length of 265 mm.; tail 8 mm.

Calamaria javanica.

Calamaria javanica, Boulenger, Ann. Nat. Hist., (6) VII, 1891, p. 279; De Rooij, Sn. Indo-Austral. Archipel., II, 1917, p. 176; Wall, Rec. Ind. Mus., XXII, 1921, p. 729 (Johore).

Diameter of the eye about equal to its distance from the mouth; rostral as high as broad, frontal a little longer than broad, three to five times as broad as the supraocular, shorter than the parietals; no preocular, 1 postocular; 4 upper labials, the second and third touching the eye; first pair of intralabials in contact with one another behind the mental. Scales in 13 rows. Ventrals 151 - 186; subcaudals 15 - 17.

Light or dark brown above, uniform on each scale with a light dot; a yellow interrupted collar present or absent; lower surface yellowish or brownish.

Total length 207; tail 12 mm.

Wall refers a specimen in the Indian Museum captured at Johore to this species. Otherwise it is known from Java and Sumatra.

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*Sworder (Journ. Malay. Br., R.A.S., VII, 1929, p. 337 and text figures) records from Fraser's Hill a fourth specimen which I have seen. It has only 165 ventrals, no yellow spots on the tail but a large pair near the head. N. S.

Sub-family HOMALOPSINAE (p. 158)

With the exception of the Australian genus *Myron*, all the known genera of this subfamily have now been found in the Malay Peninsula.

KEY TO THE GENERA.

I. Ventrals well developed, not keeled.	
A. Nasal shields in contact with one another.	
Parietals well developed; scales smooth ...	*Enhydris.*
Parietals well developed, scales strongly keeled	*Homalopsis.*
Parietals more or less broken up; scales keeled ...	*Cerberus.*
B. Nasals separated by an internasal.	
Maxillary teeth 12 to 15, no edentulous space anteriorly; loreal present; body not elongate	*Gerarda.*
Maxillary teeth 6 to 8, an edentulous space anteriorly; loreal normally absent; body not elongate	*Fordonia.*
Maxillary teeth 10 to 13, an edentulous space anteriorly; loreal present; body very elongate	*Cantoria.*
II. Ventrals very narrow, bicarinate.	
Scales smooth	*Hipistes.*
Scales keeled; two rostral appendages ...	*Erpeton.*

Genus **Enhydris**
Hypsirhina, p. 158.

Enhydris Latreille, Hist. Nat. Rept., IV, p. 200 (1802); Stejneger, Herpet. Japan, p. 300 (1907).

As shewn by Stejneger, Latreille's *Enhydris* should be used for this genus, the type being Schneider's *Hydrus enhydris* = *Enhydris enhydris*.

Enhydris sieboldii Schleg., is probably incorrectly recorded as occurring in the Peninsula. See also Wall, in Journ. Bombay N.H. Soc., XXIX, 1924, p. 867.

Enhydris indica.

Hypsirhina indica, Boulenger, p. 159.

Since the publication of his work, Dr. Boulenger has identified a ♂ from near Taiping preserved in the Selangor Museum, (v. 165; c. 31) and a ♂ from Singapore in the Dublin Museum (v. 175; c. 34).

Enhydris plumbea.

Hypsirhina plumbea, Boulenger, p. 160; M. A. Smith, Journ. N. H. S. Siam, II, 1916, p. 162 (Patani).

Enhydris enhydris.

Hypsirhina enhydris, Boulenger, p. 160; M. A. Smith, Journ. N.H.S. Siam, II, 1916, p. 162 (Patani).

Enhydris enhydris, Sworder, S'pore. Nat., No. 2, 1922, p. 66.

Enhydris bocourti.

Hypsirhina bocourti, Boulenger, p. 161.

Hypsirhina gigantea Werner, Ann. Naturhist. Mus. Wien, XXXVI, 1923, p. 163; M. A. Smith, Ann. Mag. Nat. Hist., (10) I, 1928, p. 497.

Genus **Homalopsis.**

Homalopsis buccata, Boulenger, p. 162.

Genus **Cerberus**

Cerberus, Boulenger, p. 163.

Hurria, Stejneger, Herpet. Japan, 1907, p. 304.

Stejneger has revived Daudin's name *Hurria* for this genus on the grounds that "Doctor Boulenger identifies Russell's pl. XL as *H. rynchops*". This is not so. The plate XL to which Boulenger refers (Cat. Sn. Brit. Mus., 1896, Vol. III, p. 16) is in Vol. II of Russell, whereas plate XL to which Daudin refers is in Vol. I of Russell. Daudin refers to this snake again in his Hist. Nat. Rept., 1803, Vol. V., p. 284 under the name of *Hurria bilineata.*

The "Hurriah" of Russell, which was made by Daudin the exclusive type of his genus *Hurria*, (Mag. Encyclop. An. 8 V, 1803, p. 434) has never, as far as I am aware, been identified by anyone, and it certainly is not Schneider's *rynchops*. It was described and figured by Russell from a sketch of a head, neck and tail and a description, sent him by a correspondent. With its unusual subcaudal scutellation—the anterior plates being single and the posterior double—it should not be difficult to recognize if met with again. The name *Hurria* therefore based exclusively upon this specimen, cannot stand for the genus now under discussion and *Strephon* Goldfusz 1820, based upon the same specimen, stands in the same position. *Cerberus* Cuvier (Règne Animal, 2nd edit., 1829, vol. 2, p. 81), type *Coluber cerberus*, is correct.

Cerberus rynchops.

Cerberus rhynchops, Boulenger, p. 163; Wall, J. Bombay Nat. Hist. Soc., 1918, Vol. XXVI, p. 89, col. pl. XXVI

Hurria rynchops Sworder, S'pore. Nat., No. 2, 1922, p. 86 (Singapore).

The original spelling is preserved.

This snake is very common at Selitar on Singapore Island and at Londang on the Perak coast.

Genus Gerarda

Gerarda Gray, Cat. Sn. Brit. Mus., p. 77 (1849).
Gerardia, Boulenger, Cat. Sn. Brit. Mus., III, p. 20 (1896).

Maxillary teeth 10 to 13, very small, followed by a pair of enlarged, grooved teeth; mandibular teeth subequal. Head small, not distinct from neck; eye small, with rounded pupil; head shields large; a single internasal separating the nasals; loreal present. Body cylindrical, moderately stout; scales smooth in 17 rows.

Gerarda prevostiana.

Coluber (*Homalopsis*) *prevostianus* Eyd. & Gerv. in Guer. Mag. Zool., Cl. III, 1837, pl. XIII.
Gerardia prevostiana, Boulenger, Cat. Sn. Brit. Mus., III, p. 20 (1896). Kloss, Journ. F. M. S. Mus., X, 1921, p. 201.

Two specimens of this snake were captured at Londang and another at Kuala Kurau, on the coast of Perak.

Genus Fordonia

Fordonia leucobalia.

Boulenger, p. 164; Kloss, Journ. F. M. S. Mus., X, 1921, p. 201, Sworder, S'pore. Nat., No. 2, 1922, p. 66 (Singapore).

A specimen of this snake captured at Changi, Singapore (Raffles Mus. Coll. No. 8127) has a loreal shield present on either side, due to division of the posterior extremity of the nasal.

Genus Cantoria

Cantoria violacea.

Boulenger, p. 165; Sworder, S'pore. Nat., No. 2, 1922, p. 66 (Singapore).

Wall records this species from the Andaman Islands and as far north in Burma as the mouth of the Irrawadi (Journ. Bombay N.H.S., XXIX, 1924, p. 867).

Genus Hipistes

Hipistes hydrinus, Boulenger, p. 166.

Genus Erpeton

Erpeton Lacépède, Bull. Sc. Soc. Philom., II. 1800, p. 169.
Herpeton, Boulenger, Cat. Sn. Brit. Mus., III. p. 25 (1896).

Maxillary teeth 12 to 14, followed, after a short interval, by a pair of slightly enlarged grooved teeth; mandibular teeth subequal. Head distinct from neck, with two rostral appendages which are covered with small scales; eye small with rounded pupil; head-shields large but more or less separated from one another by small scales; loreal region covered with small scales. Body cylindrical;

scales strongly keeled in from 35 to 39 rows; ventrals very narrow, bicarinate.

Monotype *Erpeton tentaculatus*

Erpeton tentaculatum.

Erpeton tentaculatus Lacepède, Bull. Sc. Soc. Philom., II. 1800, p. 169.

Herepton tentaculatum, Boulenger, Cat. Sn. Brit. Mus., III. p. 25 (1896); Annandale, Journ. N.H.S. Siam, II, 1916, p. 91 (Singgora); Kloss, Journ. F. M. S. Mus., X, 1921, p. 201.

Rostral separated from the nasal by small scales; nasals in contact with one another or separated; prefrontals broken into small anterior and large posterior portions with an azygous shield in the middle; frontal shorter than its distance from the end of the snout, shorter than the parietals, separated from the supraoculars by small scales. 13 to 15 supralabials, separated from the eye by a series of suboculars; 17 to 19 infralabials anterior sublinguals present or absent, no posterior pair; temporal scales small, not differentiated from ordinary scales, strongly keeled.

Scales in from 35 to 39 rows, all strongly keeled; anal divided; ventrals small, 109 to 136, about twice as broad as the adjacent dorsal scales, bicarinate. Rostral appendage as long, or nearly as long as its distance from the eye.

Above reddish-brown, with a pair of ill-defined dark longitudinal stripes, one on either side of the vertebral line or joined together to form a single broad one, and with or without short cross-bars anteriorly. A broad, dark lateral stripe, starting from the snout and passing through the eye, divided on the body into an upper and lower portion by a light interval. Below yellowish-brown, with a dark stripe on either side of the ventral shields and usually a series of dark light-edged spots along the outer margin.

Total length 770 mm.; tail 195 mm.

Range. The northern part of the Malay Peninsula, Siam, Cochin China. Specimens were obtained by Annandale in the Inland Sea, Singgora.

Subfamily BOIGINAE.
Dipsadomorphinae, p. 167.

Genus **Boiga**
Dipsadomorphus, p. 167.

Boiga Fitzinger, Neue Classif. Rept., pp. 29, 31 (1826); Stejneger, Herpet, Japan, p. 381 (1907).

The occurrence of *Boiga multimaculata* and *B. gokool* in the Malay Peninsula rest upon Cantor's records, and as they have not been obtained there since, his statement may be regarded as incorrect. *B. multimaculata* is widely distributed over the Indo-Chinese peninsula but I have not seen any specimens south of Bangkok—Lat. 13′ 5° N. For remarks on the known distribution of *B. gokool*, see Wall in Journ. Bombay N.H.S., XXIX, 1924, p. 871. *B. cyanea* is here included in the fauna of the Peninsula as it has been found on Koh Pa-ngan (I. of Pennan), south of the Isthmus of Kra.

Colonel Wall has recently (Journ. Bombay Nat. Hist. Soc. XXIX, 1924, pp. 869 - 874) subdivided the genus *Boiga* into *Boiga* and *Dipsadomorphus*, retaining the former name for the species that have three enlarged grooved teeth behind the diastema and the latter for those that have only two.* The character however does not appear to be constant, for in 5 skulls of *B. cynodon* in my collection 2 specimens have 2 grooved teeth and the remainder have 3.

KEY TO THE SPECIES

Scales in 19 rows	*drapiezii.*
Scales in 21 rows; subcaudals 243 - 266; colour reddish or brownish with light and dark markings	*jaspidea.*
Scales in 21 rows; subcaudals 140 - 154; body reddish or brownish, uniform or with darker markings, head blackish	*nigriceps.*
Scales in 21 rows; subcaudals 124 - 133; colour uniform green	*cyanea.*
Scales in 21 (rarely 23) rows; subcaudals 89 - 110; colour black with white (yellow) cross-bars	*dendrophila.*
Scales in 23 (rarely 25) rows; subcaudals 114 - 159; colour brownish with dark spots or cross-bars or blackish with light cross-bars	*cynodon.*

Boiga drapiezii.

Dipsadomorphus drapiezii, Boulenger, p. 171.
Boiga drapiezii, Sworder, S'pore. Nat., No. 2, 1922, p. 66 (Singapore)

Boiga jaspidea.

Dispsadomorphus jaspideus, Boulenger, p. 170.
Boiga jaspidea, Sworder, S'pore. Nat., No. 2, 1922, p. 66 (Singapore)

Boiga nigriceps.

Dipsadomorphus nigriceps, Boulenger, p. 171.

Boiga cyanea.

Triglyphodon cyaneum Dum. & Bib., VII. p. 1079 (1854).
Dipsadomorphus cyaneus, Boulenger, Cat. Sn. Brit. Mus., III. p. 72 (1896).

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* *Fide litt.*

Anterior palatine teeth scarcely larger than the posterior; anterior mandibular teeth considerably larger than the posterior. Rostral broader than high, visible from above; internasals shorter than the prefrontals; frontal slightly longer than broad, as long as its distance from the end of the snout, shorter than the parietals; 1 preocular, extending to the upper surface of the head, rarely in contact with the frontal; 2 postoculars; temporals 2+3 or 3+3; 8 supralabials, the third, fourth and fifth touching the eye; 4 or 5 infralabials in contact with the anterior pair of sublinguals which are about as long as the posterior pair. Scales in 21 rows, the vertebral row rather strongly enlarged. Ventrals 237-256; anal entire; subcaudals 124-133.

Verdant green above, the interstitial skin black: greenish, yellowish or whitish below. Inside of mouth black, tongue purplish.

Total length 1,600 mm.; tail 320 mm.

From the Eastern Himalayas to eastern Siam and the Malay Peninsula. I obtained two specimens on Koh Pa-ngan (I. of Pennan) in the Gulf of Siam, Lat. 9′ 50° N.

Of sluggish habits, this snake makes no attempt to escape when handled, but opens its mouth widely and remains on the defensive. With its green head, large golden-brown eyes and black inside to its mouth it presents a strange sight. A specimen which I kept in captivity ate in succession one *Oligodon taeniatus*, two *Agkistrodon rhodostoma* (juveniles) and two *Trimeresurus gramineus*. The last viper was fully grown and there must have been a long struggle in the cage as everything was completely flattened down.

Boiga dendrophila.

Dipsadomorphus dendrophilus, Boulenger, p. 169; M. A. Smith, Journ. N.H.S. Siam, II, 1916, p. 162 (P. Siam).

Boiga dendrophila, Sworder, S'pore. Nat. No. 2, 1922, p. 66. (Singapore).

Very common according to Sworder on Singapore Island. The species has been met with as far north as Nakon Sritamarat (P. Siam), where I obtained it in the mountains at an altitude of 2,000 feet. One specimen had eaten a large *Agkistrodon rhodostoma*. An example captured at Bangnara, Patani, had eaten a *Chrysopelea ornata*, 4 inches longer than itself.

Boiga cynodon.

Dipsadomorphus cynodon, Boulenger, p. 172; M. A. Smith, Journ N.H.S. Siam, II, 1916, p. 162 (Patani).

Boiga cynodon, Sworder, S'pore. Nat., No. 2, 1922, p. 67 and No. 3, 1924, p. 22 (Singapore).

An aberrant example of this snake was captured at Changi, Singapore Island recently. It has only 21 scale-rows and the preoculars are narrowly in contact with the frontal. Ventrals 287. subcaudals 148. It is a male.

Genus **Psammodynastes**

Psammodynastes pulverulentus.

Boulenger, p. 173; M. A. Smith, Journ. N.H.S. Siam, II. 1916, p. 162 (P. Siam) and Journ. F. M. S. Mus., X, 1922, p. 267 (Gunong Tahan).

I have examined specimens from Bangnara, Patani, and the Nakon Sritamarat Mountains.

Psammodynastes pictus.

Boulenger, p. 174; Sworder, S'pore. Nat. No. 2, 1922, p. 67 (Singapore)

Genus **Passerita**

Dryophis, p. 174.

Passerita, Gray, Ann. Philos. (n.s.) vol. X, 1825, p. 208; Stejneger, Meddel. Zool. Mus., Kristiania, no. 2, 1914, p. 5.

According to Stejneger *Dryophis* Dalman was not published until 1827 and is therefore antedated by *Passerita* Gray of 1825.

Passerita prasina.

Dryophis prasinus, Boulenger, p. 175.

Passerita prasina, Sworder, S'pore. Nat., No. 2, 1922. p. 67, (Singapore).

Passerita xanthozonia.

Dryophis xanthozonius Boie, Isis, 1827, p. 545.

Dryophis xanthozona, Boulenger, p. 175.

Robinson and Kloss obtained this snake at Tasan, Isthmus of Kra. It has not been met with further north.

Genus **Dryophiops**

Dryophiops rubescens.

Boulenger, p. 176; Smedley, Malayan Nat., II, 1, p. 47.

Smedley records three specimens from Changi, Singapore. The range of the species extends to Java. Taylor records this species from the Philippine Islands (Philip. Journ. Sc., 1925, p. 110).

Genus **Chrysopelea**

Chrysopelea ornata.

Boulenger, p. 177; M. A. Smith, Journ. N.H.S. Siam, II, 1916, p. 163 (Patani); Sworder, S'pore. Nat., No. 2, 1922, p. 67.

A specimen from Bangnara, Patani, was found in the stomach of a *Boiga dendrophila*.

Chrysopelea pelias.

Chrysopelea chrysochlora, Boulenger, p. 178.

Chrysopelea pelias, Anderson, Kungl. Sv. Vet-akad. Handl., Stockholm, Bd. 24, no. 6, 1899, p. 35; Sworder, S'pore. Nat., no. 2, 1922, p. 67 (Singapore).

Andersson in his Catalogue of the Linnean type-specimens of snakes identifies *Coluber pelias* Linn. as the species generally recognized as *Chrysopelea chrysochlora.*

Subfamily ELAPINAE

Genus **Bungarus**

Bungarus fasciatus.

Boulenger, p. 198; M. A. Smith, Journ. N.H S. Siam, II. 1916, p. 103; Sworder, S'pore. Nat., No. 3, 1924, pp. 19 and 22 (Singapore).

A specimen of this snake was recently killed near Singapore town by Surgeon-Commander Buddle. It is the third example from the Island.

Bungarus candidus, Boulenger, p. 199.

The statement that *B. candidus* "bears a deceptive similarity in form and coloration to the harmless *Lycodon aulicus*" is not correct so far as the Malayan form of *L. aulicus* is concerned. The coloration of *L. aulicus* as given by Boulenger is consistent as regards all specimens found in the Malay Peninsula and Archipelago, and it is no doubt the resemblance of the Indian form of *L. aulicus* to *B. candidus* which has originated the statement. See also remarks by me on colour-forms of *L. aulicus* in P.Z.S., 1927, p. 221.

Bungarus flaviceps, Boulenger, p. 200.

I have examined a specimen killed in the Nakon Sritamarat mountains at 2000 feet altitude.

Genus **Naja**

Naia, p. 200.

Naja, Laurenti, Syn. Rept., p. 90 (1768).

Naja naja.

Naia tripudians, Boulenger, p. 201.

Coluber naja, Linnaeus, Syst. Nat. Ed. X, p. 221 (1758).

Naja naja, Sworder, S'pore. Nat., No. 2, 1922, p. 71 (Singapore).

We are still in need of a comprehensive survey of the various races of the common Asiatic cobra. Wall has named the Malay Peninsular form, *N. n. sputatrix* (Boie, Isis, 1827, p. 556). Journ. Bombay N.H.S.. XXX. 1925, p. 243).

Naja hannah.

Hamadryas hannah, Cantor, Asiat. Res., XIX, p. 87, pls. X—XII (1836)

Naja bungarus, Boulenger, p. 202.

Naja hannah, Sworder, S'pore. Nat., No. 2, 1922, p. 72 (Singapore). Aagaard, Journ. N.H.S. Siam, VI. 1924, p. 315.

Mr. Aagaard records a specimen of this snake killed at Nakon Sritamarat, Peninsular Siam, which was 18′ 4″ in length.

Genus **Calliophis**

Callophis, p. 203.

Calliophis Gray, Illus. Ind. Zool. II. pl. 86, figs 1—3 (1834).

Calliophis gracilis.

Callophis gracilis, Boulenger, p. 203; Sworder, S'pore Nat. no. 2. 1922, p. 72 (Singapore).

Calliophis maculiceps.

Callophis maculiceps, Boulenger, p. 204.

I have examined a specimen from Khao Roapibun, in the Nakon Sritamarat mountains. Its colour in life was as follows:—Above chestnut red, below bright coral red; tail below pale blue. Head and nape black, with elongated reddish patches on the parietal regions. A distant series of small black spots down the back and two black bars on the tail.

Genus **Maticora**

Doliophis, p. 204.

Maticora Gray, Illus. Ind. Zool. II. p. 86, figs. 4—5 (1834); Stejneger, Meddel. Zool. Mus., Kristiania, No. 2. 1914, p. 7.

Maticora bivirgata.

Doliophis bivirgatus, Boulenger, p 205.

Maticora bivirgata, Sworder, S'pore. Nat., No. 2. 1922, p. 72 (Singapore).

Boulenger records this species from Burma and Cochin-China. I do not know his authority for this statement nor do I know of any specimens to back it up. I have examined an example from Bangnara, Patani, and another was seen by Mr. W. A. Graham in the rest house at Singgora.* North of this locality I do not know of any authentic record.

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*Mr. Graham's description fits this snake so exactly that I have no doubt as to the identification.

Maticora intestinalis.

Doliophis intestinalis, Boulenger, p. 206; M. A. Smith, Journ. N.H.S. Siam, II. 1916, p. 163 (Nakon Sritamarat) and Journ. F. M. S. Mus., X. 1922, p. 267 (Pahang).

Maticora intestinalis, Sworder, S'pore. Nat., No. 2. 1922, p. 72 (Singapore).

The range of this species appears to be much the same as that of the preceding. I have examined a half-eaten specimen from the Nakon Sritamarat Mountains (? var *trilineatus*) but do not know of any authentic records north of this locality.

Family **Hydrophiidæ**

A complete review of this group will be found in my recent Monograph of the Sea Snakes (Brit. Mus. publication, 1926). Two species are added to the fauna of the peninsula and there are many changes in gêneric and specific nomenclature. The large collections of sea snakes made by the F. M. S. Museums in the Straits of Malacca and by my own collectors in the gulf of Siam have shewn that the variation of many of the species is much greater than that given by Boulenger; these forms therefore have been redescribed.

Key to the Genera

I. Maxillary bone extending forwards beyond the palatine; ventrals large, at least half as broad as the body.

A. Nostrils lateral; nasals separated by the internasals ... ... *Laticauda.*

B. Nostrils superior; nasals shields in contact with one another ... *Aipysurus.*

II. Maxillary bone not extending forwards beyond the palatine (except in *Kerilia* and *Microcephalus*); ventrals small, not more than one-quarter the breadth of the body, or absent.

A. Ventrals small but distinct throughout and normally entire.

a. Head shields regular; nasal shields in contact with one another.

19 to 23 scales round the thickest part of the body *Kerilia.*

More than 30 scales round the thickest part of the body.

1. Mental shield normal; ventrals broad anteriorly, narrow posteriorly; 5 maxillary teeth* ... ... *Thalassophina.*
2. Mental elongate, partly hidden in a groove in the symphysis; 3 to 5 maxillary teeth* ... ... *Enhydrina.*
3. Mental normal; ventrals uniform; 5–18 maxillary teeth* ... ... *Hydrophis.*

b. Head shields broken up; a pair of internasals ... ... *Kolpophis.*

B. Ventrals except quite anteriorly divided by a median longitudinal fissure, vestigial (smaller than the adjacent dorsal scales), or absent.

Ventrals vestigial or absent; dorsal scales juxtaposed, the lower 3 or 4 rows larger than the others; 3 to 6 maxillary teeth;* head large ... *Lapemis.*

Ventrals in two halves; dorsal scales pointed, very strongly imbricate; 6 or 7 maxillary teeth;* head large ... ... *Astrotia*

Ventrals when distinct, with a median fissure; dorsal scales juxtaposed, more or less quadrangular in shape; 8 to 10 maxillary teeth;* head large ... ... *Pelamis.*

Ventrals divided by a fissure; dorsal scales juxtaposed; 5 or 6 maxillary teeth;* head very small ... ... *Microcephalophis.*

Sub-family **Laticaudinae**

M. A. Smith, Monogr. Sea Sn., 1926, p. x.

Genus **Laticauda**

Platurus, p. 196.

Laticauda Laurenti, Syn. Rept. 1768, p. 109; M. A. Smith, Monogr. Sea Sn., 1926, p. 3.

The members of this family are partly terrestrial in their habits, and one of them, namely *L. colubrina*, has distinct scansorial powers. *Laticauda laticaudata* has been recorded from Achin, Sumatra; it can be distinguished from *L. colubrina* by having only 19 scale-rows.

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*Excluding the poison-fangs.

Laticauda colubrina.

Platurus colubrinus, Boulenger, p. 197.

Laticauda colubrina, Smedley and Kloss, J. Malay. Br. R. Asiatic Soc., IV, 1926, p. 163; M. A. Smith, Monogr. Sea Sn., 1926, p. 6.

The azygous shield between the prefrontal is sometimes absent.

Genus **Aipysurus**

Aipysurus eydouxi.

Boulenger, p. 195; M. A. Smith, Monogr. Sea Sn., 1926, p. 14, fig. skull.

The prefrontals may be divided to form four in a transverse series.

Three specimens of this snake have recently been acquired by the British Museum from the coast of Queensland.

Sub-family **Hydrophiinae**

M. A. Smith, Monogr. Sea Sn., 1926, p. x.

Genus **Kerilia**

Hydrophis (part), p. 186.

Kerilia Gray, Cat. Sn. Brit. Mus., p. 57 (1849); M. A. Smith, Monogr. Sea Sn., 1926, p. 31.

Maxillary bone longer than the ectopterygoid, extending forwards beyond the palatine; poison-fangs moderate, followed without any, or scarcely any, interval by from 7 to 9 teeth. Snout declivous and much narrowed anteriorly; nostrils superior, nasals in contact with one another; prefrontals small, not normally in contact with the supralabials; body robust, elongate, scales in regular rows; ventrals distinct throughout, not much broader than the adjacent scales.

The form found on the west coast of the Peninsula (*forma typica*) differs slightly from that found on the east coast.

19 - 21 scale-rows on the body; 3 infralabials touching the sublinguals; 30 - 38 dorsal bars ... ... *forma typica.*

21 - 23 scale-rows on the body 4 infralabials touching the sublinguals; 38 - 50 dorsal bars ... ... *K. j. siamensis.*

Kerilia jerdoni.

Hydrophis jerdoni, Boulenger, p. 186.

Kerilia jerdoni, M. A. Smith, Monogr. Sea Sn., 1926, p. 31., fig. skull.

Head short, snout declivous and much narrowed anteriorly; diameter of the eye equal to its distance from the mouth; rostral as high as broad; prefrontals small, usually not in contact with the supralabials; frontal much longer than broad, nearly as long as its distance from the end of the snout; 1 pre- and 1 postocular; 6 supralabials, the last often confluent with the single anterior temporal, the third and fourth touching the eye; 7 or 8 infralabials the first 3 in contact with the sublinguals, both pairs of which are well developed and in contact with one another.

17 scale-rows on the neck, 21, rarely 19, at mid-body; the scales broader than long, imbricate throughout and strongly keeled; ventrals 212 to 253, distinct throughout, a little broader than the adjacent scales.

Olive above, yellowish or white beneath, with from 30 to 38 black dorsal spots or rhombs which extend round the body to form complete bands in the young; intermediate dorsal spots or bars are usually present.

Total length 940 mm.; tail 100 mm.

Range. The east coast of the Indian Peninsula, Ceylon, the Mergui Archipelago, and the Straits of Malacca (Penang).

Kerilia jerdoni siamensis.

M. A. Smith, Monogr. Sea Sn., 1926, p. 32.

Differs from the typical form in having more scale-rows round the middle of the body (21 to 23), in having more dorsal bars or bands (38 to 50) round the body, with rarely intermediate spots.

Range. The east coast of the Malay Peninsula, Bay of Patani and Singgora, and the coast of Borneo.

Genus **Thalassophina**

Distira (part), Boulenger, Cat. Sn. Brit. Mus., p. 298 (1896).

Thalassophina, M. A. Smith, Monogr. Sea Sn., 1926, p. 33.

Maxillary bone longer than the lower aspect of the ectopterygoid, not extending as far forwards as the palatine; poison-fangs followed after an interval by 5 teeth; palatine strongly curved outwards; parietals broad, with strongly developed lateral wings. no median crest above; squamosal scarcely projecting beyond the posterior extremity of the cranium. Nostrils superior; nasal shields in contact with one another; head-shields large, regular. Body elongate, the scales on the posterior part more or less hexagonal in shape and juxtaposed; ventrals very broad anteriorly, narrow posteriorly.

One species only.

Thalassophina viperina.

Thalassophis viperina Schmidt, Abh. Naturw. Ver. Hamburg, ii, 1852, pt. 2, p. 79, pl. 3.

Hydrophis viperinus, M. A. Smith, Journ. F. M. S. Mus., X, 1920, p. 27.

Thalassophina viperina, Monogr. Sea Sn., 1926, p. 33, fig. skull.

Head short, depressed, distinct from neck, snout broadly rounded; diameter of the eye about equal to its distance from the mouth; nasal shields subtriangular, as broad as long; prefrontals much broader than long, not in contact with the labials; frontal about as broad as long, twice as broad as the supraocular; 1 rarely 2. pre- and one or two postoculars; 7 to 9 supralabials, the third to the fifth, or only 2 of them, touching the eye; temporals variable, usually a single anterior shield, but sometimes 2 or 3; 4 infralabials in contact with the sublinguals; posterior pair usually larger than the anterior and in contact with one another.

27 to 34 scale-rows on the neck, 37 to 50 on the body; ventrals (181) 226 to 274, the anterior ones half the breadth of the body, narrowing gradually until the posterior are not twice as broad as the adjacent scales; pre-anal shields considerably enlarged.

Three colour forms can be distinguished; they bear no relation to geographical areas.

1. Grey above, white below, the two colours meeting on the flank in a fairly clear line of demarcation. A common form.

2. Dorsum grey with dark rhomboidal spots or bars (25 to 35 in number) usually more or less confluent. A common form (*forma typica*).

3. Completely banded. A rare form.

Total length ♂, 925 mm.; tail 100 mm.
♀, 820 mm.; tail 80 mm.

Range. From the Persian Gulf to southern China and the Malay Archipelago. It has been obtained in the Peninsula in the Bay of Patani.

An aberrant example with only 181 ventral shields has been recorded by me (l.c.s. 1920).

Genus **Enhydrina**

Boulenger, p. 193; M. A. Smith, Monogr. Sea Sn., 1926, p. 36.

Enhydrina schistosa.

Enhydrina valakadien, Boulenger, p. 193.
Hydrophis schistosus Daudin, Hist. Nat. Rept., VII, 1803, p. 386.
Enhydrina schistosa, M. A. Smith, Monogr. Sea Sn., 1926, p. 36.

Diameter of the eye about equal to its distance from the mouth. Rostral higher than broad; prefrontals much narrowed anteriorly; frontal small, shorter than its distance from the end of the snout; 1 pre- and 1, sometimes 2, postoculars; 7 or 8 supralabials, the third and fourth, or fourth only, touching the eye, the last 2 or 3 very small; usually a single anterior temporal; mental narrow, elongate, partly hidden in a groove in the symphysis; 5 infralabials in contact with the sublinguals which are poorly developed and separated by scales.

40 to 52 scale-rows on the neck in males, 42 to 55 in females, 49 to 60 on the body in males, 51 to 66 in females, the

scales imbricate or subimbricate, with a short central keel; ventrals 239 to 322, distinct throughout, a little broader than the adjacent scales; preanals feebly enlarged.

Young grey or bluish-grey above, whitish below, with dark grey or black annuli broadest dorsally; these markings usually disappear in the adult, leaving the back of a uniform greyish colour.

Total length 1,400 mm.; tail 180 mm.

Range. From the Persian Gulf to the coast of Cochin-China and the north coast of Australia. The commonest sea-snake known.

Examination of good series from the seas west of the Peninsula shows that the prefrontal usually touches the second labial and the third and fourth labials usually touch the eye (75 per cent), whereas in the form east of the Peninsula the prefrontal usually fails to touch the labial and the fourth labial only touches the eye (70 per cent).

Genus **Hydrophis**

Hydrophis (part), p. 181.

M. A. Smith, Monogr. Sea Sn., 1926, p. 40.

Maxillary bone not extending forwards beyond the palatine; poison-fangs followed after an interval by from (1) 5 to 18 teeth; palatine straight or feebly curved. Nostrils superior, nasal shields in contact with one another; head-shields large, regular; body scales imbricate, subimbricate or juxtaposed; ventrals small, distinct throughout and normally entire.

Key to the Species

I. Scales on the thickest part of the body with rounded or bluntly pointed tips, distinctly or feebly imbricate; 5 to 8 maxillary teeth behind the poison-fangs.

a. 6 to 8 supralabials; head not small, body not long and slender anteriorly.

1 anterior temporal; scales 25 - 31/33 - 38 (4 - 8); body with black bands much narrower than their interspaces ... ... *spiralis.*

1 anterior temporal; scales 25 - 29/37 - 41 (10 - 14);* body with black bands much broader than their interspaces ... ... *melanosoma.*

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*Represents the number of scale-rows on the neck and body, and the increase in the number of scale-rows from neck to body.

2 anterior temporals; scales 29 - 35/37 - 47 (8 - 12); body with black bands broader above than below or dorsal bars only ... *cyanocinctus.*

b. 5 (rarely 6) supralabials; head small, body long and slender anteriorly.

1 anterior temporal; scales 23 - 25/33 - 37; body with black bands broadest dorsally ... *klossi.*

II. Scales on the thickest part of the body more or less hexagonal or quadrangular in shape, feebly imbricate or juxtaposed; 8 to 18 maxillary teeth behind the poison-fangs.

A. 8 to 13 maxillary teeth.

1 anterior temporal; ventrals 242 to 306; head in the adult pale grey with a suffusion of yellow above ... ... *torquatus.*

1 anterior temporal; ventrals 276 to 325; head in the adult blackish to dark olive with yellow markings across the snout and along the sides ... ... *t. aagaardi.*

2 anterior temporals; head in the adult olivaceous *ornatus.*

B. 14 to 18 maxillary teeth behind the poison-fangs.

2 anterior temporals ... ... *caerulescens.*

III. Scales on the thickest part of the body more or less hexagonal or quadrangular in shape, feebly imbricate or juxtaposed; 5 or 6 maxillary teeth behind the poison-fangs.

Scales 28 - 33/49 - 58; ventrals 414 - 514; head black ... ... *fasciatus.*

Scales 25 - 30/39 - 49; ventrals 323 - 452; head black ... ... *f. atriceps.*

Scales 25 - 31/37 - 45; ventrals 328 - 414; head with yellow markings ... ... *brookii.*

Hydrophis spiralis.

Hydrophis brugmansi, Boulenger, p. 184; M. A. Smith, Journ. F. M. S. Mus., X, 1920, p. 12.

Hydrophis spiralis Shaw., Gen. Zool., III, p. 564, pl. (1802); M. A Smith, Monogr. Sea Sn., 1926, p. 48.

Maxillary teeth behind the poison-fangs 6 or 7. Head moderate; body elongate, not slender anteriorly, its greatest diameter posteriorly being twice, or a little more, that of the neck. Diameter of the eye in the adult less than its distance from the mouth; frontal as long as its distance from the rostral or the end of the snout; 1 pre- and 1 rarely 2, postoculars; a single large anterior temporal often descending to the labial margin; 6 to 8 supralabials, the second in contact with the prefrontal, the third, fourth, and fifth, or only two of them, touching the eye; 4 infralabials in contact with the sublinguals, both pairs of which are well developed and in contact with one another; usually a small scale at the oral margin after the third or fourth infralabial.

25 to 31 scale-rows on the neck, 33 to 38 on the thickest part of the body (increase 4 to 8), the scales feebly imbricate throughout, smooth or with a small central tubercle or short keel. Ventrals 295 to 362, distinct throughout, twice as broad as long as the adjacent scales; preanals considerably enlarged.

Yellowish or yellowish-green, the dorsal scales with black margins and with more or less complete narrow black annuli, much narrower than their interspaces (2½ to 3 times), and feebly dilated vertebrally. Dorsal spots often present between the bands; in the young a black ventral line may be present. Head in the young blackish, with a yellow horseshoe-shaped mark above; in the adult usually entirely yellow.

Total length, ♂, 1620 mm.; tail 140 mm.

Total length, ♀, 1830 mm.; tail 120 mm.

Wall records a female from Madras measuring 2500 mm. in total length (Journ. Bombay N.H.S. XX, 1911, p. 858) and another from Penang measuring 2745 mm. (Journ. Bombay N.H.S., XXII. 1913, p. 404). Such large specimens are unusual.

Range. From the Persian Gulf to the Malay Peninsula and Archipelago. Recorded in the Peninsula only from Penang and Singapore.

Hydrophis melanosoma.

Hydrophis wrayi, Boulenger, p. 185.

Hydrophis melanosoma Günther, Rept. Ind., p. 367, fig., (1864); M. A. Smith, Journ. F. M. S. Mus., X, 1920, p. 10 and Monogr Sea Sn., 1926, p. 51.

Maxillary teeth behind the poison-fangs 5 or 6. Head moderate, body not slender anteriorly, compressed posteriorly, its greatest diameter being from 2 to nearly 3 times that of the neck. Diameter of the eye in the adult less than its distance from the mouth; frontal usually shorter than its distance from the rostral; 1 pre- and 1 postocular; a single large anterior temporal; 6 or 7 supralabials, the second in contact with the prefrontal, the third and fourth touching the eye, the last 1 or 2 very small; 4 infralabials in contact with the sublinguals, both pairs of which are usually well developed; usually a series of small scales at the oral margin after the second or third infralabial.

25 to 29 scale-rows on the neck, 37 to 41 on the body (increase 10 to 14), the scales imbricate throughout, with a strong keel in adult males. Ventrals 266 to 368, bicarinate, not twice as broad as the adjacent scales; preanals much enlarged.

Greenish-yellow, the dorsal scales with black margins and with 50 to 70 broad black bands, usually as broad above as below, and about twice as broad as their interspaces; rarely they taper ventrally and may be incomplete below. Head black, uniform or with a yellowish mottling which is usually confined to the snout.

Total length, 1550 mm.; tail 160 mm.

Range. The Straits of Malacca, the coast of Borneo, and Macassar. Not uncommon on the coast of Perak, whence have come nearly all the speciments that are known.

Hydrophis cyanocinctus.

Boulenger, p. 185; M. A. Smith, Journ. F. M. S. Mus., X, 1920, p. 8 and Monogr. Sea Sn., 1926, p. 56, fig. skull.

Maxillary teeth behind the poison-fangs 5 to 8. Head moderate, body elongate, not slender anteriorly, compressed posteriorly, its greatest diameter in the adult being from 2 to 2½ times that of the neck. Diameter of the eye in the adult less than its distance from the mouth; frontal usually as long as its distance from the rostral or the end of the snout; 1 pre- and 2 postoculars; normally 2 superposed anterior temporals; 7 or 8 supralabials, the second in contact with the prefrontal, the third, fourth, and fifth, or only 2 of them touching the eye; 4 infralabials in contact with the sublinguals, both pairs of which are well developed and in contact with one another or the posterior pair separated by scales; a series of small scales at the oral margin after the second or third infralabial.

27 to 35 scale-rows on the neck, 37 to 47 on the thickest part of the body (increase 8 to 14), the scales imbricate throughout, usually with a central keel, which may be broken into a series of 2 or 3 tubercles, rarely quite smooth; ventrals 290 to 390, distinct throughout, anteriorly about twice as broad as the adjacent dorsal scales, posteriorly a little less; preanals much enlarged.

Total length, 1885 mm.; tail 135 mm.

Olivaceous or yellowish with more or less distinct black annuli, broadest or best marked above or with black dorsal bars only. Very young specimens usually have a black band running along the belly.

Range. From the Persian Gulf to Japan and the seas of the Malay Archipelago.

A common species in the Straits of Malacca.

Hydrophis klossi.

Hydrophis klossi, Boulenger, p. 190; M. A. Smith, J. Bombay N.H.S., XXIII, 1915, p. 787 and Journ. F. M. S. Mus., X, 1920, p. 19, fig. and Monogr. Sea Sn., 1926, p. 68, fig. skull.

Hydrophis nigrocinctus, Laidlaw, P.Z.S., 1901, p. 579; (part.) Boulenger, p. 187.

Maxillary teeth behind the poison-fangs 5 or 6. Head small, body long and slender anteriorly, compressed posteriorly, its greatest diameter being from two or three times that of the neck; snout somewhat projecting; diameter of the eye equal to or slightly less than its distance from the mouth. Frontal small, shorter than its distance from the end of the snout; 1 pre- and 1 postocular; 1 large anterior temporal; 5, rarely 6, supralabials, the second in contact with the prefrontal, the third and fourth touching the eye, the sixth when present very small; 4 infralabials in contact with the sublinguals, both pairs of which are well developed, the posterior pair usually separated by one or two scales.

23 to 25 (27), scale-rows on the neck, 31 to 37 (39) on the body (increase 8 to 12), the scales imbricate throughout and smooth or feebly keeled. Ventrals distinct throughout, 360 to 413, not twice as broad as the adjacent dorsal scales; preanals much enlarged.

Greyish or greenish above, greenish or yellowish below, with from 50 to 75 dark bands broadest dorsally and broader than their interspaces; sometimes a black ventral line, or the neck and forebody below may be entirely black. Head blackish to olivaceous, sometimes with an indistinct horseshoe shaped mark above. In the young the markings are more clearly defined.

Total length, 1300 mm.; tail 110 mm.

Range. The Straits of Malacca and the western side of the Gulf of Siam as far south as Patani.

HYDROPHIS TORQUATUS.

Two forms, each with a very limited range, inhabit the seas of the Peninsula. They may be distinguished as follows:—

33 to 37 scale-rows on the neck, 43 to 49 on the body; ventrals 242 to 306 (av. 278). Head in the adult pale grey with a suffusion of yellow above. Straits of Malacca ...	*forma typica.*
31 to 37 scale-rows on the neck, 39 to 47 on the body; ventrals 276 to 325 (av. 297). Head in the adult blackish to dark olive with yellow markings across the snout and along the sides. E. coast of Malay Peninsula and Borneo	*H. t. aagaardi.*

Hydrophis torquatus *forma typica.*

Boulenger, p 190; M. A. Smith, Journ. F. M. S. Mus. X, 1920, p. 12 and Monogr. Sea Sn., 1926, p. 76.

Maxillary teeth behind the poison-fangs 8 to 10. Head moderate, body elongate, not very slender anteriorly, compressed posteriorly, its greatest diameter being from 2 to 3 times that of the neck. Diameter of the eye equal to its distance from the mouth; frontal shorter than its distance from the rostral; 1 pre- and 1 or 2 postoculars; a single anterior temporal; 7, sometimes 8, supralabials, the second in contact with the prefrontal, the third and fourth touching the eye, the last 2 or 3 very small; 4 infralabials in contact with the sublinguals, both pairs of which are well developed and in contact with one another, or the posterior pair separated by scales.

33 to 37 scale-rows on the neck, 41 to 49, usually 43 to 47, on the body, the posterior scales more or less hexagonal in shape, subimbricate, and with a central tubercle or short keel. Ventrals 242 to 306, distinct throughout, not twice as broad as the adjacent dorsal scales; preanals considerably enlarged.

Colour varies considerably with age. The young are whitish, with from 46 to 63 well-defined black bands, which are often incomplete ventrally; the head is black, with a whitish or yellowish mark across the snout and along the sides. Adults are pale grey above, yellowish-white below, with dark grey bands, less clearly defined and usually incomplete ventrally in the posterior part of the body. In some aged individuals the bands have almost entirely disappeared, leaving the back more or less uniform grey; the head is grey, with the yellow markings more extensive and less defined, this colour sometimes covering the whole of the top of the head except a small patch of the crown.

Total length, ♂ 835 mm.; tail 80 mm.
,, ,, ♀ 785 mm.; tail 70 mm.

Range. The Straits of Malacca. A common snake on the coasts of Perak and Selangor. It has not been met with north of Penang or south of latitude 2° N.

Hydrophis torquatus aagaardi.

M. A. Smith, Journ. F. M. S. Mus., X, 1920, p. 149 and Monogr. Sea Sn., 1926, p. 78.

Differs from the typical form in having fewer scale-rows and more ventrals.

Colour. Greyish or greenish-grey above, yellowish-white below, with from 55 to 68 dark grey or blackish annuli which may be incomplete ventrally. Head black to dark olive with yellow markings across the snout and along the sides of the head; sometimes yellow spots on the frontal and parietal shields. With age the markings lose definition.

Total length, ♂ 920 mm.; tail 120 mm.
,, ,, ♀ 930 mm.; tail 90 mm.

This form is common off the coast of Patani, and is frequently caught by the fishermen while trawling.

An aberrant specimen with 37 scale-rows on the neck, 51 on the body, and 292 ventral shields has been recorded by me from the coast of Patani (1920).

Hydrophis ornatus.

Hydrophis ornatus, Boulenger, p. 184, M. A. Smith, Monogr. Sea Sn., 1926, p. 81, fig. skull.

Hydrophis lamberti M. A. Smith, Journ. N.H.S. Siam, II, 1917, p. 340 and Journ. F. M. S. Mus., X, 1920, p. 6.

Maxillary teeth behind the poison-fangs 10 to 13; head large; body robust, not markedly elongate, its greatest diameter posteriorly being about twice that of the neck; diameter of the eye at least equal to its distance from the mouth. Frontal as long as its distance from the rostral or the end of the snout; 1 pre- and 2 or 3 postoculars; 7 or 8 supralabials, the second normally in contact with the prefrontal, the third and fourth touching the eye; 2 superposed anterior temporals; 4 infralabials in contact with the sublinguals, the anterior pair of which are well developed and in contact with one another, the posterior pair ill-developed and separated by scales. Usually no small scales at the oral margin between the infralabials

31 to 37 scale-rows on the neck in males, 38 to 45 in females, 37 to 45 on the body in males, 43 to 55 in females; ventrals 227 to 260 in males, 244 to 312 in females.

Colour. Pale greyish or olivaceous, sometimes almost white, above, with broad dark bars or rhomboidal spots separated by narrow interspaces; below yellowish or whitish; head olivaceous.

Total length, ♂ 950 mm.; tail 115 mm.
,, ,, ♀ 860 mm.; tail 80 mm.

Range. From the Persian Gulf to China and the coast of New Guinea. A rare species on the coasts of the peninsula.

Hydrophis caerulescens.

Boulenger, p. 187; M. A. Smith, Monogr. Sea Sn., 1926, p. 90. fig. skull.

Maxillary teeth behind the poison-fangs 14 to 18. Head moderately small, body not very slender anteriorly, compressed posteriorly, its greatest diameter being from 2 to 3 times that of the neck. Diameter of the eye equal to or greater than its distance from the mouth; frontal usually shorter than its distance from the rostral; 1 pre- and 1, sometimes 2 postoculars; 2, sometimes 3, anterior temporals; 7 or 8 supralabials, the second in contact with the prefrontal, the third and fourth touching the eye; 4 infralabials in contact with the sublinguals, the posterior pair usually poorly developed and separated by scales. Usually a small scale at the oral margin after the third and fourth infralabials.

31 to 43 scale-rows on the neck, 38 to 54 on the body (increase 6 to 14), the posterior subimbricate and with truncated tips, all strongly keeled. Ventrals 253 to 334, distinct throughout, not twice as broad as the adjacent dorsal scales; preanals considerably enlarged.

Bluish-grey above, yellowish-white below, with from 40 to 60 broad bands, above twice as broad as their interspaces on the forepart of the body, tapering towards the belly where they may be incomplete on the thicker part of the body. With age these markings usually become indistinct and in some old individuals are scarcely recognisable, the back being almost uniform grey. Head black in the young, sometimes with a light curved mark; dark grey in the adult with or without a light streak behind the eye.

Total length, ♂ 820 mm.; tail 100 mm.
 ,, ,, ♀ 740 mm.; tail 65 mm.

Range From Bombay to China and the Malay Archipelago. A common species in the seas round the peninsula.

HYDROPHIS FASCIATUS.

The typical form inhabits the Straits of Malacca and the seas further west; the form found east of Singapore and throughout the Malay Archipelago is *H. f. atriceps*:—

28 to 33 scale-rows on the neck, 49 to 58 on the body; ventrals 414 to 514	*fasciatus.*
25 to 30 scale-rows on the neck, 39 to 49 on the body; ventrals 323 to 453	*fasciatus atriceps.*

Hydrophis fasciatus.

Hydrophis fasciatus (part), Boulenger, p. 189.

Hydrophis fasciatus, M. A. Smith, Journ. F. M. S. Mus., X, 1920, p. 22 and Monogr. Sea Sn., 1926, p. 94.

Hydrophis rhombifer, Boulenger, p. 188.

Maxillary teeth behind the poison-fangs 5, sometimes 6. Head very small, body long and very slender anteriorly, much compressed posteriorly, its greatest diameter being from 2½ to 4 times that of the neck. Diameter of the eye equal to or greater than its distance from the mouth; frontal usually at least as long as its distance from the rostral; 1 pre- and 1, rarely 2 postoculars; a single large anterior temporal succeeded by another scale as large or larger; a series of from 2 to 4 small scales behind the parietals and between the posterior temporals; 6 or 7, rarely 5, supralabials, the second in contact with the prefrontal, the third and fourth touching the eye, the last 1 or 2 very small; 4 infralabials in contact with the sublinguals, both pairs of which are well developed and in contact with one another; a small scale usually present at the oral margin between the third and fourth infralabials.

28 to 33 scale-rows on the neck, 47 to 58 on the body (increase 20 to 27), the posterior subimbricate and more or less hexagonal in shape, with a central tubercle or short keel. Ventrals 414 to 514, distinct throughout, not twice as broad as the adjacent dorsal scales, bicarinate; preanals considerably enlarged.

Colour. Head, neck, and anterior part of body shiny black to dark olive with pale yellowish oval spots on the sides or connected as dorsal bars; posteriorly greyish above, whitish below, with dark dorsal rhomboidal spots which may extend down the sides of the body and from complete annuli in the young.

Total length, ♂, 1110 mm.; tail 100 mm.
,, ,, ♀, 990 mm.; tail 75 mm.

Range. The coasts of India and Burma and the Straits of Malacca.

Hydrophis fasciatus atriceps.

Hydrophis fasciatus (part), Boulenger, p. 180.
Hydrophis atriceps Gunther, Rept. Brit. Ind., 1864, p. 371, fig.
Hydrophis fasciatus atriceps, M. A. Smith, Journ. F. M. S. Mus., X, 1920, p. 25 and Monogr. Sea Sn., 1926, p. 97.

Differs from the typical form in having fewer scale rows and fewer ventrals, as given in the key.

Range. From the Gulf of Siam to the Philippine Islands and the north coast of Australia. Has been obtained on the peninsular coast at Singgora.

Hydrophis brookii.

Hydrophis brookii Günther, P.Z.S. 1872, p. 597, fig.; M. A. Smith, Monogr. Sea Sn., 1926, p. 90.
Hydrophis consobrinus, M. A. Smith, Journ. N.H.S. Siam, II, 1917, p. 341 and Journ. F. M. S. Mus., X, 1920, p. 20, fig.

Maxillary teeth behind the poison-fangs 5; head very small, body long and very slender anteriorly, much compressed posteriorly, its greatest diameter being from 2½ to 3 times that of the neck. Diameter of the eye equal to or greater than its distance from the mouth; frontal as long as or shorter than its distance from the rostral; 1 pre- and 1, rarely 2, postoculars; a single large anterior temporal sometimes reaching the border of the mouth and succeeded by another large scale which may be divided in two by a vertical suture; a series of from 4 to 7 small scales behind the parietals and between the posterior temporals; 6, sometimes only 5, supralabials, the second in contact with the prefrontal the third and fourth touching the eye, the sixth very small; 4 infralabials in contact with the sublinguals, both pairs of which are well developed and in contact with one another; a small scale usually present at the oral margin between the third and fourth infralabials.

25 to 31 scale-rows on the neck, 37 to 45 on the body (increase 9 to 16), those posterior subimbricate and more or less hexagonal in shape, usually with a central tubercle or short keel. Ventrals 328 to 414, distinct throughout, not twice as broad as the adjacent dorsal scales, bicarinate; preanals considerably enlarged.

Greyish above, yellowish white below, with from 60 to 80 dark grey bands or bars. Anteriorly these completely encircle the body, are of uniform breadth throughout, and about twice as broad as their interspaces; posteriorly they narrow on the sides of the body and may be incomplete ventrally. Head blackish or greyish, with a curved yellow mark extending across the snout and backwards along the sides of the head; often a connecting band of yellow across the frontal and another across the parietal shields. With age these markings lose definition.

Total length, ♂, 1035 mm.; tail 115 mm.
,, ,, ♀, 965 mm.; tail 75 mm.

Range. The Straits of Malacca as far north as Trang, the Gulf of Siam, the coast of Cochin China, and the north coasts of Borneo and Java.

Can be distinguished from *Hydrophis fasciatus*, and *H. f. atriceps* with which it has been confused, by the fewer scale-rows round the thickest part of the body, more small scales in a series behind the parietals, and by the colouration of the head.

Genus **Kolpophis**

Thalassophis, p. 195.

Kolpophis. M. A. Smith, Monogr. Sea Sn., 1926, p. 106.

Maxillary bone longer than the lower aspect of the ectopterygoid, not extending forwards as far as the palatine; poison-fangs followed after an interval by six or seven teeth. Nostrils superior; head-shields irregularly divided. Head large, body stout, covered with small, irregular, juxtaposed scales; ventrals small but distinct throughout.

Kolpophis annandalei.

Thalassophis annandalei, Boulenger, p. 195; M. A. Smith, Journ. F. M. S. Mus., X, 1920, p. 20.

Kolpophis annandalei, M. A. Smith, Monogr. Sea Sn., 1926, p. 106, fig. skull

Head large, body short, stout, its greatest diameter posteriorly not more than twice that of the neck. Diameter of the eye equal to or a little less than its distance from the mouth. Rostral entire, nasal and prefrontal shields usually divided; supraocular, frontal and parietal usually entire, the two latter variable in size; parietals separated by small scales; 9 to 11 supralabials, subject to much fragmentation; temporals small and irregular; usually no distinct sublinguals; infralabials when defined usually separated from the oral margin by small scales.

62 to 82 scales round the neck, 74 to 93 round the body, those posterior more or less hexagonal in shape, subimbricate or juxtaposed, smooth, or with a short keel; ventrals distinct throughout, 320 to 368; preanals considerably enlarged.

Yellowish, with pale grey dorsal bars, 35 to 45 in number, much broader than their interspaces and tapering to a point on the sides, or with the dorsum entirely grey; below whitish; head olivaceous.

Total length 910 mm.; tail 120 mm.

Range. Malay Peninsula (Patani bay); Cochin China; Java.

Genus **Lapemis**

Enhydris, p. 193.

Lapemis Gray, Illus. Ind. Zool., II, 1835, pl. 87; M. A. Smith, Monogr. Sea Sn., 1926, p. 108, pl 1 and text-fig. skull.

Maxillary bone longer than the lower aspect of the ectopterygoid, extending forwards as far, or nearly as far, as the palatine; poison-fangs followed after an interval by from 3 to 6 teeth; nostrils superior, nasal shields in contact with one another; head large, body stout, scales hexagonal or squarish, juxtaposed, the lowermost 3 or 4 rows larger than the others; ventrals small, usually distinct anteriorly, very small or absent posteriorly.

Only one species is definitely known to inhabit the peninsular shores.

Lapemis hardwickii.

Enhydris hardwickii, Boulenger, p. 193; M A. Smith, J. Bombay N.H.S., XXIII, 1915, p. 787 and Journ. F. M. S. Mus., X, 1920, p. 32.

Lapemis hardwickii, M. A. Smith, Monogr. Sea Sn., 1926, p. 108, fig. skull.

Enhydris cur us, Laidlaw, P.Z.S., 1901, p. 581.

Head large, body short, stout, the diameter of the neck being half or more than half the greatest diameter of the body; diameter of the eye about equal to its distance from the mouth; frontal not longer than its distance to the rostral; prefrontal normally in contact with the second supralabial, sometimes by fission of its outer extremity a pseudo-loreal is formed; 1 pre- and 1 or 2, postoculars; 2, rarely 3, anterior temporals; 7 or 8 supralabials, the third and fourth touching the eye, the last 2 or 3 very small; 3 or 4 infralabials in contact with the sublinguals, both pairs of which are variable as regards development and usually separated by small scales.

23 to 31 scale-rows on the neck in males, 27 to 35 in females; 25 to 37 on the body in males, 33 to 41 in females; the scales hexagonal or squarish, the lowermost rows with a central tubercle or short keel which in adult males may become strongly spinose; ventrals 114 to 186 in males, 141 to 230 in females, not as large as the adjacent scales except quite anteriorly, frequently absent altogether, uni- or bituberculate; preanals feebly enlarged.

Greenish or yellowish olive above, whitish below, with from 35 to 50 pale olive to dark grey dorsal bars which taper to a point on the sides. Variations from this pattern are frequent. The dorsal bars may be continued round the body as complete bands; a narrow dark ventral stripe may be present, or less frequently a broad irregular band. Coalescence of the dorsal bars often occurs in adults, so that the entire back may be uniform in coloration. Head pale olive to black, with or without yellow markings across the snout and along the sides of the head.

Total length 860 mm.; tail 85 mm.

Range. From the Mergui Archipelago to southern Japan and the coast of north Australia. Abundant in the Straits of Malacca and on the coast of Patani.

Genus **Astrotia**

Hydrophis (part), p. 183.

Astrotia Fischer, Abh. Naturw. Ver. Hamburg., III, 1856, p. 38; M. A. Smith, Monogr. Sea Sn., 1926, p. 113.

Maxillary bone longer than the lower aspect of the ectopterygoid, not extending forwards as far as the palatine, which is curved outwards; poison-fangs followed after an interval by 6 or 7 teeth. Head-shields large, regular; nostrils superior, nasal shields in contact with one another; body stout, covered with strongly imbricate scales; ventrals completely divided in two, except quite anteriorly, the halves pointed, or with the tip dentate.

Astrotia stokesii.

Hydrophis stokesii, Boulenger, p. 183.

Astrotia stokesii, M. A. Smith, Monogr. Sea Sn., 1926, p. 113. pl. 1, fig. 2.

Genus **Pelamis**

Hydrus, p. 181.

Pelamis (part), Daudin, Hist. Nat. Rept., VI, 1803, p. 361; M. A. Smith, Monogr. Sea Sn., 1926, p. 116.

Pelamis platurus.

Hydrus platurus, Boulenger, p. 181; M. A. Smith, Journ. F. M. S. Mus., X, 1920, p. 5.

Pelamis platurus, M. A. Smith, Monogr. Sea Sn., 1926, p. 116, fig. skull.

Genus **Microcephalophis**

Hydrophis (part), p. 191.

Microcephalophis Lesson, in Belanger's Voy. Ind. Orient, p. 320 (1834); M. A. Smith, Monogr. Sea Sn., 1926, p. 120.

Maxillary bone longer than the ectopterygoid, extending forwards as far as or a little farther than the palatine, the concavity on its inner aspect very small. Poison-fangs followed after an interval by 5 to 6 teeth. Head small, head-shields large, regular; nasal shields in contact with one another; body long and slender anteriorly, the scales on its posterior part hexagonal, juxtaposed. Ventrals entire anteriorly, more or less completely divided by a longitudinal furrow posteriorly, the two halves being apposed to one another or alternating.

The genus as now restricted contains two species.

KEY TO THE SPECIES AND SUBSPECIES.

Prefrontal not touching third supralabial; 220 to 350 ventrals.	
17 to 19 scale-rows on the neck; 30 to 36 on the body	*M. gracilis.*
19 to 23 scale-rows on the neck; 35 to 43 on the body	*M. g. microcephalus.*
Prefrontal touching third supralabial; 404 to 468 ventrals	*M. cantoris.*

Microcephalophis gracilis.

Hydrophis gracilis (part), Boulenger, p. 191; M. A. Smith, Journ. F. M. S. Mus., X, 1920, p. 26.

Microcephalophis gracilis, M. A. Smith, Monogr. Sea Sn., 1926, p. 121, pl. 1 and text-fig. skull

Maxillary bone extending forwards as far as or farther than the palatine. Head very small, elongate, body long and very slender anteriorly, much compressed posteriorly, its greatest diameter being 4 to 5 times that of the neck. Snout projecting beyond the lower jaw; diameter of the eye about equal to its distance from the mouth. Rostral large, extending well on to the upper surface of the snout; frontal small, usually shorter than its distance from the rostral; 1 pre- and 1 postocular; a single anterior temporal followed by another scale as large or larger; 6 supralabials, the second usually in contact with the prefrontal, the third and fourth touching the eye; 4 infralabials in contact with the sublinguals, both pairs of which are well developed and in contact with one another; no small scale at the oral margin between the infralabials.

17 to 19 scale-rows on the neck, 30 to 36 on the body (increase 12 to 16), the posterior scales hexagonal, juxtaposed, broader than

long, with 2 or 3 very small tubercles one behind the other, the lowermost rows of scales a little larger than the others and with very prominent tubercles or dentate keels in adults. Ventrals 220 to 287, entire on the slender portion of the body and broader than the adjacent dorsal scales, completely divided posteriorly by a median furrow, the two halves being apposed to one another or alternating; preanals feebly enlarged.

The young are black with a series of whitish dorsal bands or oval lateral spots on the slender part of the body, and more or less complete bands posteriorly, from 40 to 60 in number. With age the markings lose definition and the adult is usually greyish above, paler below, with the bars or bands indistinctly marked, particularly on the thickest part of the body; head olivaceous to yellowish.

Total length, ♂, 950 mm.; tail 80 mm.
,, ,, ♀, 1,025 mm.; tail 95 mm.

Range. From the Persian Gulf to southern China and the coast of Australia. Replaced in the Straits of Malacca and on the north coast of Java by *M. g. microcephalus*. Specimens of *M. gracilis* have been found at Singgora and in the Bay of Patani.

Microcephalophis gracilis microcephalus.

Hydrophis gracilis (part), Boulenger, p. 191; M. A Smith, Journ. F. M. S. Mus., X, 1920, p. 26.

Thalassophis microcephala Schmidt, Abh. Naturw. Ver. Hamburg, II, 1852, p. 78, pl. 2

Hydrophis rostralis M. A. Smith, Journ. N.H.S. Siam, II, 1917, p. 340.

Microcephalus gracilis microcephalus, M. A. Smith, Monogr. Sea Sn., 1926, p. 123.

Differs from the typical form in having more scale-rows, 21 to 23, rarely 19, on the neck, 35 to 43 on the body (increase 14 to 20); more ventrals, 250 to 350, and in the comparatively larger head and thicker fore-body, the diameter of the neck being from ⅓ to nearly ½ the greatest diameters of the body.

Colour. Bluish grey on the upper half of the body, whitish on the lower, the two colours meeting in a fairly clear line of demarcation; dark bars or bands are feebly marked or absent; head grey, yellowing with age. Juveniles have darkish dorsal bars or complete bands; very young specimens I have not seen.

Range. The Straits of Malacca and north coast of Java

Microcephalophis cantoris.

Hydrophis cantoris, Boulenger, p. 191.

Microcephalophis cantoris, M. A. Smith, Monogr. Sea Sn., 1926, p. 125, fig. skull.

Cantor's types, said to have come from Penang, are the only records of this species in the Malayan region.

Family **Amblycephalidae**

Genus **Aplopeltura**

Haplopeltura, p. 207.

Aplopeltura, Dum. and Bib., Mem. Ac. Sc. XXIII, p. 463 (1853)

Aplopeltura boa.

Haplopeltura boa, Boulenger, p. 208.

Two specimens were obtained by Mr. Nelson in the hills to the east of Chumporn (Isthmus of Kra) at an altitude of 1000 feet.

Genus **Amblycephalus**

One species, *A. carinatus* is added. It can be distinguished from the other species in the Peninsula by the prefrontal not touching the eye and by its keeled dorsal scales.

Amblycephalus malaccanus, Boulenger, p. 209.

Very rare in the Peninsula. I obtained a single specimen at Betong, Patani; in this example the vertebral row of scales only is distinctly enlarged. V. 155. C. 37. ♂.

Amblycephalus laevis, Boulenger, p. 209.

I obtained a specimen on Khao Ram in the Nakon Sritamarat mountains. V. 157. C. 44. It appears to be the most northerly record of the species.

Amblycephalus vertebralis, Boulenger, p. 210.

Amblycephalus moellendorffi, Boulenger, p. 210.

Very common at Bangnara, Patani, according to Mr. C. J. Aagaard.

Amblycephalus carinatus berdmorei.

Amblycephalus carinatus Boie, Isis, 1828, p. 1035; Boulenger, Cat. Sn. Brit. Mus., III, 1896, p. 445; M. A. Smith, Journ. N.H S. Siam, II, 1916, p. 163 (P. Siam).

Pareas berdmorei (part), Theobald, Cat. Rept. Asiat. Soc. Mus., 1868, p. 63.

Amblycephalus carinatus hainanus M. A. Smith, Journ. N.H.S. Siam, VI, 1923, p. 204.

Rostral distinctly higher than broad; internasals about half the size of the prefrontals; frontal as long as broad or a little longer than broad, longer than its distance from the end of the snout, longer or shorter than the parietals; loreal higher than long; eye surrounded by from 4 to 7 shields in addition to the supraocular, viz., 1 or 2 preoculars, 2 or 3 suboculars, 1 or 2 postoculars; temporals 2+3 or 3+3, 7 or 8 supralabials, the last very long; first lower labial in contact with its fellow behind the mental; three pairs of large sublinguals, broader than long. Scales in 15 rows, the 3 dorsal rows slightly enlarged and more or less distinctly keeled, the keels sometimes hardly distinguishable. Ventrals 161 - 189; anal entire; subcaudals 68 - 100.

Yellowish or reddish-brown above, more or less finely speckled with black, and with blackish transverse spots or more or less regular cross-bars interrupted on the vertebral line; a black line on each side of the head behind the eye, confluent with an X-shaped black blotch on the nape; an oblique black line from the eye to the last supralabial; yellowish or white beneath, dotted or striolated with blackish, or with a median black line.

Total length 660 mm.; tail 135 mm.

Range. From Southern Burma to Hongkong and the northern part of the Malay Peninsula. It is common at Bangnara, Patani according to Mr. Aagaard and it has also been obtained at Klong Tun Sai and in the hills east of Chumporn. There are two specimens from Taiping and another without recorded locality, in the Taiping Museum

As pointed out by me (1923) the form from the Asiatic mainland has more ventrals and subcaudals than the typical form which belongs to the Malay Archipelago

Family **Viperidae**

Genus **Agkistrodon**

Ancistrodon, p. 212.

Agkistrodon Beauvois, Trans. Amer. Phil. Soc., IV, 1709, p. 381

Agkistrodon rhodostoma.

Ancistrodon rhodostoma, Boulenger, p. 213; M. A. Smith, Journ N.H.S. Siam, II, 1916, p. 164 (Patani).

This snake is common at Bangnara, Patani; its range extends to the extreme north of Siam.

It is oviparous. A female in my possession laid 13 eggs and guarded them until they hatched out 47 days later. (J. Bombay N.H.S. XXIII, 1915, p. 788).

Genus **Trimeresurus**

Lachesis, p. 214.

Trimeresurus Lacepede, Ann. Mus. d'Hist. Nat., Paris, IV, 1804, p. 209.

Trimeresurus and *Lachesis*, Mocquard, Bull. Mus., d'Hist. Nat. Paris, 1915, p. 115.

Except that *Trimeresurus borneensis* is now regarded as synonymous with *T. puniceus* there is no change to be recorded in this genus.

Trimeresurus monticola.

Lachesis monticola, Boulenger, p. 216.

A specimen was obtained in the hills east of Chumporn (Isthmus of Kra) near the Burmese border by Mr. Nelson. The range of the species extends into Annam.

Trimeresurus purpureomaculatus.

Lachesis purpureomaculatus, Boulenger, p. 216.

Trimeresurus purpureomaculatus, Sworder, S'pore. Nat. No. 2, 1922, p. 73 and 3, 1924, p. 19.

Trimeresurus gramineus.

Lachesis gramineus, Boulenger, p. 217.

Trimeresurus gramineus, M. A Smith, Journ. F. M. S. Mus., X, 1922, p. 267 (Fraser's Hill).

Trimeresurus sumatranus.

Lachesis sumatranus, Boulenger, p. 217.

Trimeresurus sumatranus M. A. Smith, Journ. F. M. S Mus , X, 1922, p. 268 (Kuala Teku).

I have recently examined a specimen from Patani.

Trimeresurus puniceus.

Cophias punicea Boie, Isis, 1827, p. 561.

Lachesis borneensis, Boulenger, Cat. Sn. Brit. Mus , III. 1896, p. 560; De Rooij, Sn. Indo-Austral. Archipel., 1917, p. 286.

Lachesis borneensis, Boulenger, p. 218.

Trimeresurus puniceus M A. Smith, Journ Siam Soc., Nat. Hist. Suppl. VII, 1928, p. 194.

A specimen has recently been obtained near Kanburi, Siam, on the Tenasserim border, Lat. 14° N.

Trimeresurus wagleri.

Lachesis wagleri, Boulenger, p. 218; M. A. Smith, Journ. N H S. Siam, II. 1916, p. 164, (Patani).

Trimeresurus wagleri, Sworder, S'pore. Nat. No. 2, 1922, p. 73.

The common viper of Singapore according to Sworder. Patani marks its northern range. This snake, and *T. purpureomaculatus,* are the two species commonly kept in the Snake Temple at Penang.

I have examined a specimen from Patani and one from Pangnga on the mainland of peninsular Siam, just north of Puket.

CLASS AMPHIBIA

BATRACHIA, p. 221.

The increasing importance of the tadpole in taxonomy has induced me to compile the following synopsis of the Malayan genera. Besides serving as a key to assist in their identification, it summarises briefly what else is known with regard to the larval period of their lives. The descriptions of the tadpoles will be found under their respective headings.

I. Spiracle sinistral; eyes supero-lateral.	
A. Mouth subterminal; lips large, more or less fringed with papillae; horny mandibles and teeth.	
Vent dextral; tip of tail pointed; spawn laid in masses in the water	(in part) *Rana*. (in part) *Megophrys*.
Vent dextral; tip of tail pointed; spawn made into frothy nests out of the water	*Rhacophorus*. *Philautus*.
Vent median; tip of tail pointed; a large ventral adhesive disc behind the mouth ...	(in part) *Rana*.
Vent median; tip of tail rounded[1]; spawn laid in strings	*Bufo*.
Spawn laid in strings; tadpole unknown ...	*Nectophryne*.
B. Mouth terminal, small, consisting of a short upper and a horse-shoe-shaped lower lip; no fringe of papilae; horny mandibles but no teeth; vent median	*Oœidozyga*.
C. Mouth without mandibles or teeth. the lips much enlarged and forming a funnel; vent median	(in part) *Megophrys*.
II. Spiracle medio-ventral: mouth without horny mandibles or teeth, consisting of a simple upper and a contractile lower lip; eyes entirely lateral: vent median; spawn laid in masses	*Brevicipitidae*.

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[1] Except in *B. penangensis*.

Family **Ranidae**

Genus **Oœidozyga**

Oxyglossus, p. 224.

Oœidozyga Kuhl and Van Hasselt, Isis, 1822, p. 475; M. A. Smith P.Z.S., 1927. p. 202.

Oœidozyga lima.

Oxyglossus lima, Boulenger, p. 225; M. A. Smith. Journ. N.H.S. Siam, II, 1916, p. 172, pl. (tadpole).

Tadpole similar to that of *O. laevis* but the dorsal crest very high at its commencement, rising almost abruptly from the base of the tail and diminishing gradually as it passes backwards.

Oœidozyga laevis [*See* Note, p. 135].

Oxyglossus laevis, Boulenger, p. 225; M. A. Smith, Journ. F. M. S. Mus., X, 1922, p. 271 (Kuala Tahan).

Oxyglossus laevis martensi, M. A. Smith, Journ. N.H.S. Siam, II, 1916, p. 173.

The name *martensi* has been applied to the form from the mainland of Asia, as being smaller (28 - 30 mm. in length) than the one from the Archipelago. This is not strictly correct. Specimens from the Philippines (type locality) and from Flores are considerably larger (42 mm. from snout to vent), but specimens from other parts of the Archipelago that I have examined, (Celebes, Sumbawa) are not larger than those from continental Asia.

Genus **Rana**

Seven species are new to the fauna of the Peninsula. In devising a key to meet their needs, I have taken full advantage of Mr. Boulenger's recent Monograph on the Asiatic and Australian Frogs, published in the Records of the Indian Museum, Vol. XX, 1920.

Key to the Species

I. Digits pointed or with the tips feebly dilated, the dilatation without horse-shoe-shaped horizontal groove separating the upper and lower surfaces; outer metatarsals separated by web, at least in the distal half; no dorso-lateral glandular fold (except sometimes in *R. limborgi* and young of *R. macrodon*). *Rana, sensu stricto.*

A. Inner metatarsal tubercle small but very prominent, pointed, digitiform; digits acutely pointed; toes webbed to the tips ... ... *cyanophlyctis.*

B. Inner metatarsal tubercle blunt or compressed, not digitiform.

a. Toes with obtuse or slightly swollen tips; male with external vocal sacs and with a more or less developed nuptial pad on the first finger.

Toes completely webbed, the web reaching the discs of all the toes, throat with a dark median stripe ... ... *tigrina rugulosa.*

Toes incompletely webbed, the web not reaching the discs of the 2nd and 3rd toes on their inner side; throat marbled ... ... *cancrivora.*

Toes half to two-thirds webbed ... ... *limnocharis.*

b. Toes with the tips dilated into distinct discs; male without pad on the first finger.

1. Tympanum indistinct or hidden; toes 2/3 to fully webbed; male without vocal sacs.

Toes fully webbed; heel not reaching beyond the eye ... ... *kuhli.*

Toes not fully webbed; heel reaching beyond the eye ... ... *laticeps.*

2. Tympanum quite distinct; male without vocal sacs.

Toes broadly webbed; skin of the back smooth or with small warts; male with enlarged head and tooth-like projections in the lower jaw ... *macrodon.*

Toes nearly entirely webbed; skin of the back smooth or with irregular glandules; male without enlarged head or tooth-like projections in the lower jaw ... ... *doriæ.*

Toes nearly entirely webbed; skin of the back smooth or with irregular glandules; male with enlarged head, with a prominence on the top of the head behind the orbits, and tooth-like projections in the lower jaw ... *macrognathus*

Toes nearly entirely webbed; skin of the back with 8 or 10 longitudinal folds; male with enlarged head, with prominence on the top of the head behind the orbits, and tooth-like projections in the lower jaw ... ... *plicatella.*

Toes $\frac{1}{3}$ to $\frac{1}{2}$ webbed; male with enlarged head and tooth-like projections in the lower jaw ... *hascheana.*

II. Toes, often also fingers, dilated at the end, the dilatation bearing a horse-shoe-shaped horizontal groove separating the upper and lower surfaces; outer metatarsals bound or separated by a groove at the extreme distal portion; no dorsal-lateral fold. *Discodeles.*

Vomerine teeth well developed: toes ½ webbed ... *tasanae.*

Vomerine teeth feebly developed or absent; toes ¼ webbed ... ... *tenasserimensis.*

III. Digital discs as in II; outer metatarsals separated by web, at least in the distal half; dorso-lateral fold present or absent. *Hylarana.*

A. Dorso-lateral fold absent.

Toes ½ to 2/3 webbed; first finger much longer than second; back with flat warts, at least on the sides ... ... *glandulosa.*

Toes ⅔ webbed; first finger much longer than second; back smooth or finely granulate ... *signata.*

Toes not ½ webbed; first finger a little longer than second; back smooth ... ... *luctuosa.*

B. Dorso-lateral fold present.

a. Toes never entirely webbed, at least the terminal phalanx of the fourth being free; discs of fingers small.

1. Dorso-lateral fold narrow, web reaching the discs of third and fifth toes.

Heel reaching end of snout or beyond; male with internal vocal sacs and a gland at the elbow. *cubitalis.*

Heel reaching the eye; male with external vocal sacs and a humeral gland ... ... *miopus.*

Heel reaching end of snout or beyond; limbs very slender; male with internal vocal sacs and no gland on the arm ... ... *alticola.*

2. Dorso-lateral fold broad; web reaching discs of third and fifth toes.

First finger extending beyond second; a small external metatarsal tubercle ... ... *nigrovittata.*

First finger not extending beyond second; external metatarsal tubercle usually absent ... *erythræa.*

3. Dorso-lateral fold narrow; web not reaching discs of third and fifth toes; head distinctly longer than broad.

Toes half-webbed; foot as long as or longer than tibia ..., ... *macrodactyla.*

Toes ⅔ webbed; foot as long as or shorter than tibia ... ... *nicobariensis.*

b. Toes nearly entirely webbed; discs of fingers large; dorso-lateral fold moderately broad, distinct only anteriorly ... ... *chalconota.*

c. Toes very broadly webbed, the web involving the discs of all the toes; dorso-lateral fold narrow, poorly developed; vomerine teeth well developed.

Disc of third finger much smaller than tympanum; first finger extending as far as or slightly beyond second; heel to far beyond snout; male with external vocal sacs ... ... *jerboa.*

Disc of third finger much smaller than tympanum; first finger not extending beyond second; heel to beyond end of snout; male with internal vocal sacs ... . *hosii.*

Disc of third finger nearly as large as tympanum; first finger extending beyond second; heel to beyond end of snout; male with external vocal sacs ... . *livida.*

IV. Digital discs very large, larger than the tympanum; outer metatarsals completely separated; tympanum small or absent; vomerine teeth feebly developed or absent. *Staurois.*[*]

Vomerine teeth present ... ... *latutensis.*

Rana cyanophlyctis.

Boulenger, p. 228; Annandale, Journ N.H.S. Siam, II, 1916, p 91 and Mem. Asiat. Soc Bengal, VI, 1917, p. 143 (Patelung).

Annandale's discovery of this frog in the Inland Sea, Singgora, is remarkable, as it has not been discovered elsewhere in any part of the Indo-Chinese Peninsula or Malaysia. Cantor's record of specimens said to have come from Penang, cannot be relied upon.

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[*] *Staurois* has been redefined by Boulenger (Ann. Mag. Nat. Hist. (9) I, 1918, p. 372) to include this species. I find it completely connected with ***Hylarana*** through ***Rana afghana***.

Rana tigrina rugulosa.

Rana rugulosa Wiegmann, Nova Acta Acad. Leop. Carol., XVII, p. 258, pl. 21; Annandale, Mem. Asiat. Soc. Bengal, VI, 1917, p. 126.

Rana tigrina, (part), Boulenger, p. 234; Robinson and Kloss, Journ. F. M. S. Mus., V. 1915, p. 155 (Koh Pa-ngan).

Rana tigrina pantherina, Boulenger, Rec. Ind. Mus., XX, 1920, p. 21.

The *Rana tigrina* of Boulenger on p. 234 is a composite of *R. tigrina and R. cancrivora,* the difference between the two species, as far as they are concerned in the Peninsula, being the extent of webbing of the toes, the colouration of the throat, and the tadpole.

In *R. tigrina* the toes are fully webbed, and the throat is spotted with black and has a more or less distinct dark median stripe. In *R. cancrivora* the toes are not so completely webbed, the web not reaching the tips of the second and third toes on the inner side, and the throat is marbled with black and white. Annandale's figures in Mem. Asiat. Soc. Bengal, VI, 1917, pl. V., shew these colour distinctions well.

The tadpoles of the two frogs are entirely different as is also the breeding call of the males. The tadpole described by Boulenger (p. 234) is that of *R. t. rugulosa.*

Range. Widely distributed over the Indo-Chinese subregion this frog just reaches the Malay Peninsula in the extreme north. I obtained two specimens at Chumporn, and the example figured by Annandale (1917) is from Koh-Samui.

Rana cancrivora.

Rana cancrivora Gravenhorst, Delic. Mus. Zool. Vratisl., I. p. 41 (1829); Annandale, Mem. Asiat. Soc. Bengal, VI, 1917, p. 128, pl. V; M. A. Smith, Journ N.H.S. Siam, II, 1917, p. 264 (Chumporn); Boulenger, Rec. Ind. Mus., XX, 1920, p. 23; Sworder, S'pore. Nat., No. 5, 1925, p. 99 (Pulau Senang).

Rana tigrina (part), Boulenger, p. 234.

The tadpole is practically indistinguishable from that of *R. limnocharis.*

Range. *R. cancrivora* has not yet been definitely recorded from the southern part of the Peninsula, except for Sworder's record from Pulau Senang, near Singapore. It is common at the mouth of the Chumporn river and Annandale records it as not uncommon in the vicinity of the Inland Sea, Singgora.

In the neighbourhood of Patani town this frog grows to a much larger size than it does in any other part of its range. It differs also from the form found in any other part of Siam in having a light vertebral stripe (present or absent). The following table will shew the measurements of this new form, for which I propose the name *R. c. raja,* as compared with the typical form.

Rana cancrivora raja, subsp. nov.

	♂	♀
From snout to vent ...	87	120 mm.
Breadth of head ...	28	40 ,,
Hind-limb	130	164 ,,
Foot	43	51 ,,
Author's number (types) ...	7,442	7,395

Rana cancrivora forma *typica*.

	Java		*Bangkok*		*Philippines*	
	♂	♀	♂	♀	♂	♀
From snout to vent ...	77	75 mm.	60	73 mm.	69	67 mm.
Breadth of head ...	25	25 ,,	20	28 ,,	23	22 ,,
Hind-limb ...	117	119 ,,	84	102 ,,	98	94 ,,
Foot	39	38 ,,	29	37 ,,	35	34 ,,

Rana limnocharis.

Boulenger, p. 236; M. A. Smith, Journ. N.H.S. Siam, II. 1916, p. 166 (tadpole).

Ferguson's description of the tadpole, quoted by Boulenger, is incorrect. The larva bears a close resemblance to that of *R. cancrivora*.

Length of head and body about 1½ times its width. Eyes superolateral, about 2½ times as far apart as the nostrils. Tail 1½ to 2 times as long as the head and body, four times as long as high, the tip bluntly pointed; crests, moderate, subequal. Mouth subterminal; lips with short papillae at the sides, and below except for a short gap in the midline. Mandibles edged with black; upper lip with two series of teeth, the outer long and uninterrupted, the inner broadly interrupted; lower lip with three series, all uninterrupted, the outer one very short.

Total length 45 mm.; head and body 12 mm. Olivaceous, speckled with black; posterior half of tail with or without dark bars or entirely black.

Rana kuhli.

Boulenger, p. 229 and Rec. Ind. Mus., XX, 1920, p. 64; M. A. Smith, J. Nat. Hist. Soc. Siam, II, 1917, p. 147, pl. (tadpole).

I have seen a specimen from Bangnara, Patani.

The tadpole has been described from specimens obtained in the north of Siam.

Head and body considerably depressed, one and a half times as long as broad; eyes distinctly on the upper surface of the head; nostrils midway between the eyes and the tip of the snout. Spiraculum sinistral, nearer the eye than the vent which is dextral.

Mouth small, subterminal, with short papillae at the sides and below. Beak broadly edged with black; upper lip with a long, continuous row of teeth, followed by a second broadly interrupted; lower lip with three continuous rows or the upper one narrowly interrupted, the lowest row about half the length of the first and second, which are subequal in length. Tail 4 times as long as high; crests rather low, the upper one a little deeper than the lower.

Total length 45 mm.; head and body 16 mm.; depth of tail 7 mm.

Olive above speckled with blackish; whitish below.

Rana laticeps.

Boulenger, p. 230 and Rec. Ind. Mus., XX, 1920, p. 67; M. A. Smith, Journ. F. M. S. Mus., X, 1922, p. 271 (Pahang).

Common on Fraser's Hill. The range of the species extends into Borneo (Journ. Sarawak Mus., III. 1925, p. 32).

Rana macrodon.

Rana macrodon, Boulenger, p. 233; M. A. Smith, Journ. N.H.S. Siam, II. 1916, p. 165 (Nakon Sritamarat) and Journ F. M. S. Mus., X, 1922, p. 272 (Pahang).

Rana macrodon var. *blythii*, Boulenger, Rec. Ind. Mus., X, 1920, p. 43.

All specimens of *R. macrodon* from the northern part of the Peninsula differ from those found in the south in having a narrower head, larger eye and longer hind-limbs. They have been named by Boulenger var. *blythii*, who points out however (1920) that "the distinction of this variety is rather vague and the naming of certain specimens is rather arbitrary". The characters moreover do not coincide with any definite geographical distribution, and the name, in a racial sense, cannot be used.

I found this frog common in the Nakon Sritamarat hills, and Robinson and Kloss obtained it at Tapli, Tasan, and Mamoh. The range of the species extends into Annam.

Rana doriæ.

Boulenger, p. 231 and Rec. Ind. Mus., XX, 1920, p. 49; M. A. Smith, Journ. N.H.S. Siam, IV 1922, p. 217 and Journ. F. M. S Mus., X, 1922, p. 271 (Kuala Teku).

Robinson and Kloss obtained this frog at Mamoh and Tapli, near the Isthmus of Kra.

Rana macrognathus.

Rana macrognathus, Boulenger, Ann. Mag. Nat. Hist. (8) XX. 1917, p. 414 and Rec. Ind. Mus., XX. 1920, p. 51; M. A. Smith, Journ. N.H.S. Siam, IV. 1922, p. 218 (fig).

Description of the fully grown male. Vomerine teeth in strong oblique series, commencing between the choanae and extending posteriorly beyond them, their distance from each other about equal to their distance from the choanae. Lower jaw with well developed bony projections in front. Head considerably broader than long, moderately depressed; snout rounded, scarcely projecting beyond the mouth, much longer than the eye; canthus rostralis obtuse, loreal region scarcely concave; nostril a little nearer the tip of the snout than the eye; distance between the nostrils equal to the interorbital width, which is much greater than that of the upper eyelid; tympanum very distinct, as large as or larger than the eye. Starting from between the orbits and extending backwards to the level of the anterior border of the tympanum is a prominent rounded swelling.

Fingers moderate, blunt, first a little longer than second, third as long as the snout; subarticular tubercles moderate. Hind-limb moderately long, the tibiotarsal articulation reaches the eye or a little beyond, the heels overlap when the limbs are folded at right angles to the body; tibia about twice in length of head and body, a little longer than the foot. Toes moderately long, the tips dilated into small but very distinct discs, nearly entirely webbed, the web extending as a fringe to the discs of all the toes; subarticular tubercles moderate; inner metatarsal tubercle, moderately prominent, about half the length of the inner toe; no outer tubercle.

Skin above with irregular glandules; a strong, curved, supratympanic fold.

Olivaceous, with irregular dark markings; usually a dark band between the eye bordered with yellow in front; lips with dark bars, limbs with dark cross bars. Below white, the throat and chest often spotted with brown. No vocal sacs or other sexual characters.

Female without the enlarged head; the interorbital space being narrower and the tympanum smaller.

From snout to vent 48 mm.

Tadpole. Length of head and body 1¾ times its breadth, moderately depressed. Eyes superolateral, the distance between them a little greater than that between the nostrils. Tail about three times as long as the head and body, four times as long as high, the tip pointed; crests low, subequal.

Mouth small, subterminal, a fringe of papillae at the sides and below; mandibles edged with black; upper lip with two series of teeth, the inner one narrowly interrupted; lower lip with three series, the inner one interrupted, the outer short, half the length of the second.

Reddish or brownish olive, spotted and speckled with darker.

Total length 35 mm.; head and body 12 mm.

Range. From the Karen hills to the northern part of the Malay Peninsula. Robinson and Kloss obtained it on Pulau Rawi and De Lisle Island (W. coast), and I have obtained it in the Nakon Sritamarat mountains.

Rana plicatella.

Boulenger, p. 231; M. A. Smith, Journ. N.H.S. Siam, IV. 1922, p. 227 (fig.) and Journ. F. M. S. Mus., X, 1922, p. 273 (Fraser's Hill).

Tadpoles which I have referred to this frog closely resemble those of the preceding species. They differ in the longer and narrower tail and in that the upper crest does not reach to the root of the tail.

Rana hascheana.

Rana hascheana, Boulenger, p. 232. and Rec. Ind. Mus., XX, 1920, p. 54; M. A. Smith, Rec. Ind. Mus., XXXI, 1929, p. 77.

Rana limborgi W. L. Sclater, P.Z.S. 1892, p. 344, pl. 24; Boulenger, Rec. Ind. Mus., XX, 1920, p. 56.

My reasons for regarding *R. limborgi* as a synonym of *R. hascheana* have been given elsewhere (l.c.s.). Boulenger's description of this frog does not include the characters of the fully grown male, which apparently has not yet been obtained in the Peninsula. A redescription of the species therefore becomes necessary.

Description of the fully grown male. Vomerine teeth in oblique oval groups just behind the level of the choanae; bony prominences in front of the lower jaw, well developed.

Head large, moderately depressed, as long as broad or a little broader than long, snout rounded, scarcely projecting beyond the mouth, as long as the eye; canthus rostralis obtuse; loreal region moderately oblique, slightly concave; nostril equidistant from the eye and the tip of the snout, or a little nearer the latter; distance between the nostrils equal to or greater than the interorbital width, which equals or exceeds that of the upper eyelid; tympanum distinct, ⅔ to ¾ the diameter of the eye.

Fingers rather short, the tips dilated into small discs, first as long as or slightly longer than the second, third as long as or slightly shorter than the snout; subarticular tubercles moderate.

Hind limb rather long, the tibiotarsal articulation reaching to between the eye and the tip of the snout, or a little beyond; heels overlapping when the limbs are folded at right angles to the body; tibia 1⅔ to 2 times in length of head and body, as long as or a little longer that the foot. Toes rather short, the tips dilated into small but very distinct discs, ⅓ to ½ webbed, 3 phalanges of the fourth toe free; subarticular tubercles moderate; inner metatarsal tubercle large, very prominent, compressed, blunt edged, ⅔ to ¾ the length of the inner toe; no outer tubercle.

Skin smooth, usually with more or less distinct traces of a narrow glandular dorsolateral fold beginning behind the upper eyelid; a strong fold from the eye to the shoulder.

Pale brown above with small darker spots; upper surface of snout sometimes pale greyish or yellowish; a dark crossbar between the eyes and often a Λ-shaped marking between the shoulders; a blackish streak on each side of the head, passing through the eye; lips with dark brown vertical bars; a yellowish vertebral stripe sometimes present; limbs with more or less regular dark cross-bands. Lower parts white, throat sometimes spotted or speckled with brown.

No vocal sacs, or other secondary sexual characters except the enlarged head. Female like the male but without the cranial enlargement.

The eggs of this frog are unpigmented, few and very large.

Range. From Upper Burma to Tonkin and the Malay Peninsula. Very common in the northern part of the peninsula. Robinson and Kloss found it abundant at Koh Rah and Mamoh. It has been obtained also on Penang Hill and on Gunong Angsi, Negri Sembilan, at 3,000 feet.

Rana tasanae.

Rana pullus (not of Stoliczka, 1870) M. A. Smith, Journ. F. M S. Mus., X. 1921, p 197, pl. 11 ...

Rana tasanae, M. A. Smith, Journ. N.H.S. Siam, IV. 1921, p. 193.

Vomerine teeth in very oblique series, commencing between the choanae and extending well behind them; tongue without median papilla.

Head rather large, as broad as long, depressed; snout rounded or obtusely pointed, feebly projecting beyond the mouth, a little longer than the eye; canthus rostralis obtuse, loreal region oblique, concave; nostril nearer the tip of the snout than the eye; distance between the nostrils equal to or greater than that of the upper eyelid; tympanum very distinct, ½ to [illegible] the diameter of the eye.

Fingers moderately long, first slightly shorter than second, discs moderately large; subarticular tubercles large and prominent. Hind limb moderately long, the tibiotarsal articulation reaches the tip of the snout or not quite so far. Discs of the toes like those of the fingers; toes half webbed; outer metatarsals bound together; a feebly prominent inner metatarsal tubercle; no outer tubercle.

Skin smooth, with a glandular network of fine folds on the upper parts. A strong fold from the eye to the shoulder.

Dark grey or blackish above; whitish below, thickly speckled with dark grey except on the belly. Juveniles usually paler, with indistinct crossbars on the limbs.

From snout to vent (♀) 40 mm.; (♂) 33 mm.

Male without vocal sacs and with an enlarged nuptial pad on the first finger.

Eggs large and few, unpigmented.

Range. Known only from Tasan (type locality) and Mamoh, near the Isthmus of Kra.

Rana tenasserimensis.

Rana tenasserimensis W. Sclater, P.Z.S. 1892, p. 345, pl. XXIV; Boulenger, Ann. Mus. Civ. Genova, (2) XIII. 1893, p. 331.

Cornufer tenasserimensis, Boulenger, Ann. Mag. Nat. Hist. (9) I. 1918, p. 373.

Vomerine teeth usually absent, when present very poorly developed; no papilla on the tongue.

Head moderate, depressed, broader than long, snout obtusely pointed, feebly projecting beyond the mouth, as long as the eye; canthus rostralis obtuse; loreal region feebly oblique, concave; distance between the nostrils greater than the interorbital width, which is about equal to that of the upper eyelid; tympanum quite distinct, half the diameter of the eye.

Fingers moderately long with well developed discs; first finger shorter than second, third as long as the snout.

Hind limb moderately long, the tibiotarsal articulation reaches to between the eye and the tip of the snout. Toes with discs like those of the fingers, webbed at the base; outer metatarsals bound together; metatarsal tubercles poorly developed; a feeble internal metatarsal tubercle; no outer tubercle.

Skin smooth or with a few fine longitudinal glandular folds; a feeble fold above the tympanum present or absent.

Olive or greyish (greenish in life) above, with lighter and darker markings; a pale band on either side starting from behind the eye and extending to the middle of the back usually present; limbs with dark bars. Below whitish, the throat usually, and sometimes the whole of the lower parts, speckled with brown.

From snout to vent 25 mm.

Males without vocal sacs.

Eggs very large and few, unpigmented.

Range. Southern Burma and the northern parts of the Malay Peninsula. I found this small frog common on Khao Ram and Khao Ronpibun, in the Nakon Sritamarat mountains, at an elevation of 2,000 feet and higher.

R. tenasserimensis and its near ally *R. tasanae* appear most closely related to the south Indian *R. beddomi* and they are provisionally placed under *Discodeles* Boulenger (Rec. Ind. Mus. XX. 1920, p. 109) the characters of which they exhibit except that they have no lingual papilla.

Rana glandulosa.

Boulenger, p. 236; M. A. Smith, Journ. N.H.S. Siam, II. 1916, p. 167 (Patani) and Journ. F. M. S. Mus. X. 1922, p. 272 (Fraser's Hill).

I have seen a specimen from Langsuan (Lat. 10° N.).

Rana signata.

Rana signata, Boulenger, p. 237; Van Kampen, Amphib. Indo. Austral. Archipel., p. 227 (1923) (*picturata=signata*).

Rana picturata, Boulenger, Rec. Ind. Mus., XX. 1920, p. 179; M. A. Smith, Journ. F. M. S. Mus. X. 1922, p. 272 (Pahang).

Robinson and Kloss obtained a specimen at Tasan (Isthmus of Kra).

Van Kampen has regarded (1923) *picturata* as identical with *signata* and I think correctly.

Rana luctuosa.

Boulenger, p. 238; M. A. Smith, Journ. F. M. S. Mus., X. 1922, p. 273 (Fraser's Hill).

Rana cubitalis.

M. A. Smith, Journ. N.H.S. Siam, II. 1917, p. 277 and Rec Ind. Mus., XXVI. 1924, p. 138 (tadpole); Boulenger, Rec. Ind. Mus., XX. 1920, p. 138.

Vomerine teeth well developed, in oblique series, commencing between the choanae and extending posteriorly beyond them, about as far distant from the choanae as from each other.

Head depressed, as long as broad; snout obtusely pointed, projecting moderately beyond the mouth, a little longer than the eye; canthus rostralis strong; loreal region oblique, deeply concave, nostril equidistant from the eye and the tip of the snout; distance between the nostrils greater than the interorbital width, which is equal to or less than that of the upper eyelid; tympanum very distinct, nearly as large as the eye.

Fingers rather slender, swollen at the end and without horizontal groove between the upper and lower surfaces; first finger much longer than second, third longer than the snout; subarticular tubercles moderately large, prominent.

Hind limb moderately long, the tibiotarsal articulation reaches to the tip of the snout or just beyond; the heels strongly overlap when the limbs are folded at right angles to the body; tibia $1\frac{2}{3}$ to $1\frac{3}{4}$ times in length from snout to vent, longer than the foot. Toes moderately long, the tips dilated into small discs, with a horizontal groove between the upper and lower surfaces, nearly entirely webbed, two phalanges of the fourth toe being free; outer metatarsals separated nearly to the base; subarticular tubercles prominent; inner metatarsal tubercle half the length of the first toe; a prominent outer tubercle.

Skin of the upper parts granulate, sometimes with flat, rounded glandules upon the flanks or longitudinal glandular folds upon the hind limbs. A narrow and very prominent dorsolateral fold from above the tympanum to the hip; posterior part of thighs with flattened glandules.

Light greyish-brown or olivaceous above and on the sides, with an irregular chain of small black spots along each flank; a dark brown streak along the canthus rostralis, dark spots on the lips and a patch enclosing the tympanum; limbs with dark cross bars; back of thighs marbled with dark brown and yellow. Lower parts yellowish or whitish sometimes the throat and chest spotted with brown.

Male with internal vocal sacs and with a round flat gland on each side of the breast in front of the base of the arm. A well developed pad on the first finger extending as a broad band on the inner side of the forearm to expand into a large rounded gland at the elbow. In the male the dorsolateral fold is more prominent and all the glandular structures upon the upper parts of the body more strongly developed than in the female.

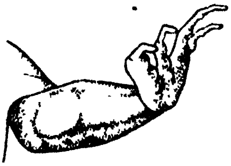

Fig. 5. Arm of *Rana cubitalis*.

From snout to vent 78 mm.; males a little smaller.

Tadpole. Length of head and body 1½ times its breadth, not markedly depressed; snout rounded; nostrils midway between the eyes and the end of the snout, nearly as far apart as the interorbital space; eyes superolateral.

Tail about 3 times as long as high, the tip pointed; crests full, subequal in depth, the upper just extending on to the back.

Mouth large, subterminal, its width nearly half that of the body; a fringe with short papillae at the sides and below. Beak narrowly margined with black, with finely serrated edges; upper lip with 2 long series of teeth, the lowest narrowly interrupted; lower lip with 3 long uninterrupted series.

A patch of granular skin on each side of the back behind the eye.

Colour, above light brown with darker spots.

Total length 38, head and body 14 mm.

Range. Originally discovered in the mountains of north Siam (Doi Nga Chang) this frog has been since found in the Karen Hills and in the mountains of Nakon Sritamarat.

The type specimen is No. 2836 (author's number). B. M. 1919. 3. 28. 5, not the one described by Boulenger.

Rana miopus.

Rana miopus Boulenger, Journ. N.H.S. Siam, III. 1918, p. 11 and Rec. Ind. Mus., XX. 1920, p. 149; M. A. Smith, Journ. F. M. S. Mus. X. 1922, p. 273 (Pahang).

Rana lateralis, Laidlaw, P.Z.S., 1900, p. 886, pl. LVII and (in part), Boulenger, p. 239.

Vomerine teeth in strong, slightly oblique series between the choanae, nearly touching the anterior corners of the latter. Head as long as broad, depressed; snout obtusely pointed, feebly projecting beyond the mouth, slightly longer than the eye; canthus rostralis distinct; loreal region oblique, concave; nostril a little nearer the tip of the snout than the eye; distance between the nostrils a little greater than that between the orbits, which is less than that of the upper eyelid; tympanum very distinct ¾ to quite as large as the eye.

Fingers moderately long, the tips dilated into very small discs, with a horizontal groove between the upper and lower surfaces feebly developed; first finger much longer than the second, nearly as long as the third, which is as long as the snout; subarticular tubercles strong, very prominent.

Hind limb moderately long, the tibiotarsal articulation reaches as far as the eye or a little farther; the heels overlap when the limbs are folded at right angles to the body; tibia about half the length of the head and body, a little longer than the foot. Toes with very small discs, ⅔ to ¾ webbed, two phalanges of the fourth toe being free; outer metatarsals separated nearly to the base, subarticular tubercles very prominent; inner metatarsal tubercle elliptic, very prominent, half the length of the inner toe; outer tubercle feebly developed or absent.

Skin of the back smooth or finely granulate; a narrow glandular dorsolateral fold from above the tympanum to the hip, and a series of fine oblique (from left to right) folds or series of small tubercles between the dorsolateral folds.

Grey or greyish-brown or olivaceous above, uniform or blotched with pink and black and with oblique blackish streaks following the lines of the oblique folds on the dorsum; loreal region and tympanic area dark brown; upper lip white; limbs with more or less distinct dark cross-bars; hinderside of thighs black, speckled or vermiculate with yellow; lower parts white. Young, pinkish and grey above, with the canthus rostralis, superciliary edge and the dorsolateral fold bright pink, the side of the head and body black.

Male with very prominent vocal sacs, appearing as pouches through a slit on either side of the throat in front of the arm, a large flat, oval gland at the shoulder and a nuptial pad on the inner side of the first finger.

From snout to vent 73 mm.

Range. Originally discovered at Kwala Aring in Kelantan, this frog has since been obtained in the Nakon Srıtamarat mountains, at Kuala Tembeling and Kuala Tahan in Pahang and in the Chikus Forest Reserve, Perak.

Rana alticola.

Hylorana tytleri, (non Theobald), Stoliczka, Journ. Asiat. Soc. Bengal, XXXIX. 1870, p. 148, pl. IX.

Rana alticola Boulenger, Cat. Batr. Ecaud., p. 52, fig. (1882) and Rec. Ind. Mus., XX. 1920, p. 166; Annandale, Rec. Ind. Mus., VIII. 1912, p. 22 (tadpole); M. A. Smith, Rec. Ind. Mus., XXVI. 1924, p. 138, fig. (tadpole).

Vomerine teeth in short oblique series between the choanae or extending a little beyond the level of their posterior borders, equally distant from each other and from the latter.

Head longer than broad, much depressed; snout a little longer than the eye, more or less obtusely-pointed, moderately or feebly projecting beyond the mouth; canthus rostralis strong; loreal region feebly oblique, concave; nostril nearer the end of the snout than the eye; distance between the nostrils equal to or a little less than the interorbital region, which equals or exceeds that of the upper eyelid; tympanum very distinct ⅗ to nearly once the diameter of the eye.

Forelimb slender; fingers long and slender, with small discs which are longer than broad and bear a groove separating the upper from the lower surface; first finger a little longer than the second, third longer than the snout; subarticular tubercles large, very prominent.

Hindlimb long and slender, the tibiotarsal articulation reaching the tip of the snout or beyond; heels strongly overlapping when the limbs are folded at right angles to the body; tibia 1⅔ to 2 times in length from snout to vent, considerably longer than the foot. Toes slender, with discs the same as those of the fingers but a little broader, webbed to the discs of the third and fifth, 2 phalanges (rarely one only) of the fourth free; outer metatarsals separated nearly to the base; subarticular tubercles large and prominent; inner metatarsal tubercle oval, about ½ the length of the inner toe; a more or less distinct outer tubercle.

Skin smooth; a feebly prominent, narrow, glandular dorsolateral fold from above the tympanum to the hip, another, sometimes indistinct, from behind the tympanum to the shoulder.

Light brown above, scarcely or not spotted, sides dark brown; a light vertebral streak may be present above the coccyx; dorsolateral fold whitish, black-edged on the outer side; upper lip whitish with a dark margin; limbs with or without narrow dark crossbands. Lower parts white, the throat brown or with crowded brown spots, usually with a light median line.

Males with internal vocal sacs; no other secondary sexual characters.

From snout to vent 50 mm. Males are smaller than females.

Tadpole. Length of head and body about 1½ to 1¾ times its breadth, feebly depressed. Eyes superolateral, the distance between them about twice that between the nostrils. Tail 2 to 2½ times the length of the head and body, 3 times as long as high; crests full, subequal.

Mouth large, subterminal; a fringe of papillae at the sides and below; mandibles broadly edged with black; upper lip with 7 or 8 series of teeth, the outer 2 uninterrupted, the rest paired; lower lip with 7 or 8 series all uninterrupted except the innermost.

The young tadpole is yellowish in colour with large black spots, or is entirely black; the fully grown tadpole is dark brown or black with a large orange or yellow ocellus near the base of the tail.

There is a parotid-like flat, oval gland on each side of the body and usually a third near the base of the tail.

Total length 96 mm.; head and body 33 mm.

Range. Hills of Assam, Tonkin, Siam and the northern part of the Malay Peninsula. It has been obtained at Tasan, Taph, Mamoh, and Nakon Sritamarat. Annandale states he has seen tadpoles which he identifies as belonging to this frog, in Kashmir.

Rana nigrovittata.

Limnodytes nigrovittatus Blyth, Journ Asiat. Soc. Bengal., XXVI. 1855, p 718

Rana nigrovittata, Boulenger, p. 242 and Rec. Ind Mus XX. 1920, p. 144; M. A. Smith, Journ. N.H.S. Siam, II. 1910, p. 42, fig. (tadpole) and Journ. F.M.S. Mus., X. 1922, p. 274 (Kuala Teku).

In the male the vocal sacs may shew externally as feebly developed pouches.

Tadpole. Length of head and body 1½ to 1¾ times its breadth, considerably depressed; eyes superolateral, the distance between them not twice that between the nostrils. Tail about twice as long as the head and body, 4 times as long as high, the tip obtusely pointed; crests moderate, subequal.

Mouth subterminal; a fringe of papillae at the sides and below; beak edged with black; upper lip with two series of teeth the outer long and uninterrupted, the inner broadly interrupted by the beak; lower lip with three series of equal length, the inner narrowly interrupted.

Olive or light brown, speckled with darker.

Total length 50; head and body 13 mm.

Specimens of this frog have been obtained at Tasan (Isthmus of Kra) by Robinson and Kloss and by me in the Nakon Sritamarat mountains.

Rana erythræa.

Boulenger, p. 241 and Rec. Ind. Mus., XX. 1920, p. 152; Van Kampen, Nat. Tijdschr. Ned-Indie, LXIX. 1909, p. 35 (tadpole).

Tadpole. Length of head and body 1¾ times its breadth, moderately depressed. Eye superolateral the distance between them twice that between the nostrils. Tail twice the length of the head and body, 3½ to 4 times as long as high, crests moderate, subequal.

Mouth subterminal, fringed with papillae at the sides and below. Mandibles narrowly edged with black; upper lip with a single series of teeth, lower lip with 2 series, the inner narrowly interrupted.

Greenish or brownish, speckled with darker; usually a dark streak along the sides of the head and body. Fully grown tadpoles usually have a vertebral and two lateral light lines.

Total length 58 mm. head and body 13 mm.

Rana macrodactyla.

Boulenger, p. 238 and Rec. Ind. Mus., XX, 1920, p. 155; M. A. Smith, Journ. N.H.S. Siam, II. 1917. p 265, figs. (tadpole).

Tadpole. Length of head and body twice its breadth, moderately depressed; eyes superolateral, twice as far apart as the nostrils. Tail twice as long as the head and body, 3½ times as long as high, the tip pointed; crests full, the upper one a little higher than the lower.

Mouth subterminal, with papillae at the sides and below. Mandibles edged with black; upper lip with one long series of teeth; lower lip with 2, the inner interrupted, the outer very short.

Reddish, brownish or olivaceous, with darker markings; below golden or whitish. As with the tadpole of *R. erythræa* the white longitudinal dorsal lines of the frog can be distinguished in the well grown tadpole.

Total length 33 mm.; head and body 11 mm.

Rana nicobariensis.

Boulenger, p. 240 and Rec. Ind. Mus., XX, 1920, p. 162.

I have examined specimens from the Nakon Sritamarat Mountains. The range of the species extends into S. E. Siam.

Tadpoles from Tenasserim, said to belong to *R. nicobariensis* are in the British Museum collection. They closely resemble the larvae of *R. alticola*.

Length of head and body nearly twice its breadth, feebly depressed; snout rounded. Eyes superolateral, the distance between them 1½ times in the distance between the nostrils, which are midway between the eyes and the tip of the snout. Spiraculum a little nearer the eye than the vent. Tail about twice as long as the head and body, three times as long as high, the tip bluntly pointed, crests subequal. Mouth subterminal, fringed with papillae on the sides and below. Beak narrowly edged with black. Upper lip with seven series of teeth, the first two interrupted; lower lip with seven series, only the innermost interrupted. Yellowish-brown with dark spots and markings. Tail with black dots and three or four ocelli. A large oval gland on either side of the back behind the eye, and another below near the base of the tail. Both glands are variable in size.

The tadpole assigned to this frog by van Kampen, with doubt, is quite different. (Amphib., Indo-Austral. Archipel., 1923, p. 224).

Rana chalconota.

Hyla chalconota Schlegel, Abbild., p. 24, pl. IX (1837).

Rana labialis, Boulenger, p. 242: M. A. Smith, Journ. N. H. S. Siam, II, 1916, p. 168 (Nakon Sritamarat); Van Kampen, Amphib. Indo-Austral. Archipel., 1923, p. 220.

Rana chalconota, Boulenger, Rec. Ind. Mus., XX, 1920, p. 201. M. A. Smith, Journ. F. M. S. Mus., X, 1922, p. 274 (Kuala Teku): Van Kampen, Amphib. Indo-Austral. Archipel., 1923, p. 217

I found this frog common in a large swamp at Khao Ram in the Nakon Sritamarat Mountains. Its habits were entirely arboreal. Robinson and Kloss also obtained it at Tasan and Mamoh (Isthmus of Kra).

Dr. van Kampen (in litt.) agrees with me that *R. labialis* should be united with *R. chalconota*.

Rana jerboa.

Boulenger, p. 244 and Rec. Ind. Mus., XX, 1920, p. 199

Boulenger's statement that the male of this frog has internal vocal sacs is a slip which he later corrected. There is a small external vocal sac on each side of the throat.

The tadpoles referred to by Boulenger (Cat. Batr., 1882, p. 89 and Rec. Ind. Mus., 1920, p. 199) from Bantam, Java, as belonging to the species are probably correctly identified, but his description of the mouthparts of the tadpole is not correct.

The three specimens are much sodden and the teeth are now rubbed off, but the dental fringes shew the formula to be 4 + 4/5 + 5.

Whether the tadpoles really came from Java is open to doubt. They were purchased from a dealer and said to have been collected by Mr. H. O. Forbes.

Rana hosii.

Rana hosii, Boulenger, p. 243, and Rec. Ind. Mus., XX. 1920 p. 199; M. A. Smith, Journ. F. M. S. Mus., X, 1922, p. 274 (Gunong Tahan).

Rana cataracta, M. A. Smith, Journ. F. M. S. Mus., X, 1922, p. 274 (Nakon Sritamarat and Fraser's Hill).

After comparing my *Rana cataracta* with the specimens of *R. hosii* in the British Museum, I find that I must unite the two species. The male of *R. hosii* differ from the female in having a larger eye, larger tympanum and more prominent dorsolateral fold. All the specimens from Nakon Sritamarat that I have seen were of a bright green colour above in life. Robinson and Kloss obtained a single example at Tasan (Isthmus of Kra).

The habits of this species are those of a tree-frog. The call of the male, heard at night only, is a short whistling cry, sometimes almost a scream.

Van Kampen (Amphib. Indo-Austr. Archipel., 1923, p. 216) has referred the Bantam tadpoles (mentioned under *R. jerboa*) to *R. hosii*, but as I have there shewn, probably incorrectly.

Rana livida.

Rana livida, Boulenger, p. 245 and Rec. Ind Mus., XX, 1920, p 214

Rana graminea, Boulenger, Rec. Ind. Mus., XX, 1920, p. 204

I have examined two specimens from the Nakon Sritamarat Mountains. The species is widely distributed over the Indo-Chinese subregion. It extends east as far as Tonkin and Hainan, the frog described by Boulenger under the name of *R. graminea* being in my opinion identical with *R. livida*.

The tadpole of *R. livida* is I believe not yet known. My reasons for referring the larva which I described as that of *R. livida* (Rec. Ind. Mus., XXVI, 1924, p. 134) to *R. afghana*, have been given elsewhere. (Rec. Ind. Mus., XXXI, 1929, p. 78).

Rana larutensis.

Rana larutensis, Boulenger, p. 245; M. A. Smith, Journ. F. M. S. Mus., X. 1922, p. 277 (Pahang).

Staurois larutensis, Boulenger, Ann. Mag. Nat. Hist., (9) I, 1918, p. 374

Robinson and Kloss obtained this frog at Tapli and Tasan (Isthmus of Kra) and I have examined a large series from Ban Chanaha and Betong (Patani).

Van Kampen includes Borneo in the range of this species. (Amphib. Indo-Austr. Archipel., 1923, p. 234).

Noble has recently (Ann. N. York Acad. Sci., XXX, 1927, p. 107) redefined the genus *Staurois* to include all those species of *Rana* in which the larva is provided with a ventral sucker behind the mouth. He states "there is no real difference in the anatomy of the adults and I have referred them all to *Staurois*. Thus a larval character .*.*.*.*. has pointed the way towards what I believe to be the only natural grouping of a difficult division of frogs".

If all the frogs with a ventral sucker have been correctly identified, however, the resulting group does not appear to me to be a very natural one, as instanced by *R. jerboa*, *R. cavitympanum*, *R. whiteheadi* on the one hand and *R. larutensis*, *R. afghana* and *R. natator* on the other.

A parallel condition of affairs is to be found in the larvae of *Bufo penangensis* and *B. asper*, species which neither closely resemble one another nor have characters by which they can be separated from the genus *Bufo*.

The ventral sucker, in fact, like the adhesive mouth which is found in tadpoles in other parts of the world and in genera which are quite unrelated to one another, is evidently an adaptive character, developed to enable the creature to cope with its environment, the mountain torrent, and not an ancestral one.

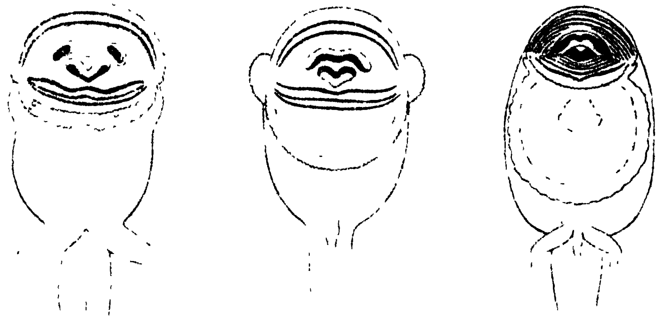

Fig. 6. Tadpoles of *Bufo penangensis*, *B. asper* and *Rana larutensis*.

Genus **Rhacophorus**

Boulenger, p. 247

My reasons for using the name *Rhacophorus* in preference to *Polypedates* have been given recently in P.Z.S. 1927, p. 213.

Three species are added to the fauna of the Peninsula. The amended key will read as follows:—

I. Fingers free or with a rudiment of a web;
snout rounded.

Upper parts very warty ... ... *leprosus*.

Upper parts smooth; skin of head in the adult involved in the cranial ossification; choanae moderate ... ... *leucomystax*.

Upper parts smooth; skin of head not involved in cranial ossification; choanae very large ... *colletti*.

II. Outer two fingers half webbed; snout very pointed, strongly projecting ... *appendiculatus chaseni.*

III. Fingers entirely webbed; snout rounded.

No cutaneous fold along the limbs; loreal region nearly vertical ... ... *robinsoni.*

Cutaneous folds along the limbs and above the vent feebly developed; loreal region oblique *bimaculatus.*

Cutaneous folds along the limbs strongly developed; anal fold strongly projecting; loreal region oblique ... ... *prominanus.*

Cutaneous folds along the limbs and above the vent strongly developed; loreal region oblique ... ... *nigropalmatus.*

Rhacophorus leprosus, Boulenger, p. 247.

Rhacophorus leucomystax, Boulenger, p. 248.

Rhacophorus colletti.

Boulenger, P.Z.S. 1890, p. 36; M. A. Smith, P.Z S. 1924, p 225 (Patani).

Vomerine teeth in two oblique series between the very large choanae. Head subtriangular in shape as long as broad; snout a little longer than the diameter of the orbit; canthus rostralis angular; loreal region oblique, slightly concave; nostril nearer the tip of the snout than the eye; interorbital space a little broader than the upper eyelid; tympanum very distinct, $\frac{3}{4}$ the size of the eye. Discs of fingers about half as large as the tympanum, of toes smaller; fingers with a slight rudiment of a web, toes nearly entirely webbed; subarticular tubercles moderate; a very small inner metatarsal tubercle; the tibiotarsal articulation reaches far beyond the tip of the snout.

Skin of the head free; upper parts smooth, belly and lower surface of thighs granulate.

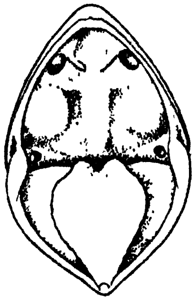

Fig. 7. Open mouth of *Rhacophorus colletti*

Greyish or greyish-brown above, loreal region and sides of body lighter; back usually with an X-shaped dark mark; sides and back of thighs marbled with black and yellowish; limbs with dark cross-bars; anal region blackish, with a white edge above; lower parts whitish, the throat with or without dark vermiculations.

From snout to vent 75 mm.

Mr. Aagaard obtained two specimens of this frog at Bangnara, Patani. Otherwise it is known only from the Malay Archipelago.

Rhacophorus appendiculatus chaseni.

Polypedates appendiculatus Gunther, Cat. Batr. Sal., p. 79 (1858).

Rhacophorus chaseni, M. A. Smith, P.Z.S. 1924, p. 226, pl. 1, fig. 1.

Vomerine teeth in slightly oblique groups touching the anterior inner borders of the choanae. Head longer than broad, much depressed, triangular in shape; skin over the cranial region not adherent to the bone; snout acutely pointed, projecting beyond the nostrils in a pronounced tip, much longer than the orbit; canthus rostralis distinct; loreal region very oblique, concave; nostril considerably nearer the tip of the snout than the eye; interorbital space nearly twice as broad as the upper eyelid; tympanum distinct, three-fifths the diameter of the eye, its distance from the eye half its own diameter, clearly visible from above owing to the unusual slope of the temporal region.

Outer two fingers nearly half webbed, inner fingers slightly less; discs of the fingers as broad as long, two-thirds the size of the tympanum; toes fully webbed, their discs not as large as those of the fingers; subarticular tubercles well developed; a prominent inner metatarsal tubercle one-third the length of the inner toe no outer tubercle. Hindlimb slender, the tibiotarsal articulation reaches nearly to the nostril.

Skin smooth above, strongly granular on the belly and below the thighs, throat smooth; a fold from the eye to the shoulder; a denticulate dermal fold from the elbow along the outer side of the forearm and hand, another along the outer side of the foot terminating at the tarsometatarsal joint in a pointed flap; a strong fold below the vent interrupted in the middle, and a denticulate fringe along the ramus of the lower jaw.

Greyish above, speckled with darker; below greyish white. Inner fingers and toes paler than the outer; interdigital membranes dark grey.

From snout to vent 50 mm.

Range. The Malay Peninsula and Borneo. Differs from the typical form which inhabits the Philippines in the longer snout and in the stronger and more denticulate cutaneous fringes upon the limbs and jaw.

The two specimens known were collected near the Teku river, Gunong Tahan (altitude 1,500 metres) by Mr. F. N. Chasen.

Rhacophorus robinsoni, Boulenger, p. 249.

Rhacophorus bimaculatus.

Boulenger, p. 250; M. A. Smith, Journ. F. M. S. Mus., X. 1922, p. 278 (Fraser's Hill).

The species is common in the Nakon Sritamarat mountains.

The tadpole is indistinguishable from that of *Rh. reinwardti*- Length of head and body 1⅔ times its breadth, moderately depressed. Eyes superolateral, farther apart than the nostrils. Tail 1½ to 2 times as long as the head and body, 3 times as long as high, the tip pointed. Mouth subterminal, with papillae at the sides and below; beak edged with black; upper lip with five or six series of teeth, all except the outer row paired; lower lip with three continuous series.

Greyish above, paler below.

Total length 26 mm.; head and body 11 mm.

Rhacophorus prominanus.

M. A. Smith, Journ. F. M. S. Mus., XI. 1924, p. 185, fig

Vomerine teeth in transverse or slightly oblique series between the choanae. Head broader than long, much depressed; snout rounded or obtusely pointed, projecting feebly beyond the mouth, considerably longer than the orbit; nostril a little nearer the tip of the snout than the eye; canthus rostralis distinct, loreal region oblique, concave; interorbital space much broader than the upper eyelid; tympanum very distinct, ⅘ the size of the eye.

Fingers broadly webbed, the membrane between the outer three involving the discs; discs large, broader than long, that of the third broader than the tympanum. Toes fully webbed, their discs much smaller than those of the fingers; subarticular tubercles well developed; a small, oval inner metatarsal tubercle, ⅖ the length of the inner toe; outer metatarsals completely separated; the tibiotarsal articulation reaches the tip of the snout.

Skin of the back smooth or with small scattered tubercles, skin of the head free; of the belly coarsely granular. A strong fold of skin along the outer side of the arm and hand and another along the outer side of the foot as far as the heel. Anal region with a strongly projecting rounded or squarish cutaneous flap, the vent opening in the middle of its under surface.

Light yellowish-brown above, (verdant green in life) with numerous small dark punctiform spots; below yellowish-white, uniform. Supraorbital region and anal flap ochreous yellow, web of fingers greenish yellow, web of toes yellow at base, carmine at the margin.

From snout to vent 68 mm.

Distinguished from *Rh. reinwardti*, its nearest ally, by the less broadly webbed toes, the prominent anal flap and coloration.

Originally discovered at Jor, Batang Padang, Perak, this frog has since been obtained at Banang Star in Patani.

Rhacophorus nigropalmatus, Boulenger, p. 251.

Count Gyldenstolpe obtained a specimen of this frog in the extreme north of Siam.

Genus **Philautus**

Ixalus, p. 252.

Philautus Gistel, Naturg, Thierr., 1848, p. 10; Stejneger, Proc. U. S. Nat. Mus, XXVIII. 1905, p. 346

Ixalus, Boulenger, p. 252 (name preoccupied).

Examination of large series of *Philautus* have convinced me that several of the characters used by Boulenger to distinguish the species cannot be relied upon. The size of the tympanum is variable and is usually more distinct in the adult than in the young, comparison of it therefore with the size of the finger discs is unsatisfactory. The length of the hind limb may shew considerable variation in individuals of the same species, while the skin of the upper parts of some species is tubercular in the young but smooth in the adult. Bearing these points in mind, I find myself unable to separate *P. castanomerus* and *P. larutensis* from *P. petersi*, and *P. brevipes* from *P. vermiculatus*. One species, *P. bimaculatus* is added to the fauna of the Peninsula.

It is now generally recognized that the presence or absence of vomerine teeth can no longer be regarded as a character of generic distinction. Although fully accepting this principle I am not in agreement with those authors who have hastily sunk all the species of *Philautus* under *Rhacophorus*. That some forms of *Philautus* should be placed under *Rhacophorus* is no doubt correct, but the distinctive habit of many other species, suggests that characters will yet be found to retain them apart from *Rhacophorus*. Until a proper revision of the whole group is undertaken, I prefer to retain the two genera as defined by Boulenger.

KEY TO THE SPECIES

I. Fingers free or with a rudiment of a web; outer metatarsals bound together or separated only distally.

A. Upper parts smooth or with soft tubercles; tympanum not very distinct.

Head moderate, triangular in shape, snout pointed ... ... *petersi.*

Head large, snout rounded ... ... *vermiculatus.*

B. Upper parts rough with granular asperities; tympanum very distinct.

Snout pointed; loreal region nearly vertical; toes half webbed ... ... *pictus*

Snout rounded; loreal region oblique; toes ¾ webbed ... ... *asper*.

II. Outer two fingers ⅔ webbed; outer metatarsals separated nearly to the base.

Eye larger than its distance to the nostril; skin smooth ... ... *bimaculatus*.

Eye smaller than its distance to the nostril, skin rough with granular asperities ... ... *horridus*.

Philautus petersi.

Ixalus petersi, Boulenger, p. 252 and P.Z.S. March 1900, p. 185, fig.

Philautus petersi, M. A. Smith, Journ. Sarawak Mus III. p. 1925, p. 10 (*castanomerus = petersi*).

Ixalus tarutensis, Boulenger, Ann. Mag. Nat. Hist., Aug. (7) VI. p. 187 (1900) and Fauna. p. 253.

Ixalus castanomerus Boulenger, Journ. F. M. S. Mus., I 1905, p. 39, pl. IV. and Fauna, p. 254; M A. Smith, Journ. F. M. S Mus., X. 1922, p 280 (Pahang).

The range of this small frog extends into Northern Siam (Khun Tan, Lat. 18° N.) and Southern Cambodia. I have found it frequently among dry leaves on a jungle path often at a considerable distance from any stream. The male has a large subgular vocal sac.

P. petersi appears most closely related to the Javan *P. aurifasciatus* from which it differs in having a larger and more triangular shaped head.

Philautus vermiculatus.

Ixalus vermiculatus, Boulenger, p. 254.

Ixalus brevipes, Boulenger, 253.

Philautus brevipes, M. A. Smith, Journ. F M. S. Mus., X, 1922, p. 279 (Pahang).

Coloration very variable. Usually greyish olive above, with symmetrical markings or with vermiculations.

Philautus pictus.

Ixalus pictus, Boulenger, p 255.

I have seen a specimen from Banang Star, Patani. The species has been recently discovered in the Mentawi Islands (Ann. Mag. Nat. Hist., (9) XVIII, 1926, p. 78).

Philautus asper.

Ixalus asper. Boulenger, p. 255.

The range of the species extends into northern Siam and Annam (Langbian plateau).

Philautus bimaculatus.

Leptomantis bimaculata Peters, Monatsb. Akad Berlin, 1867, p. 32.

Philautus bimaculatus, van Kampen, Amphib. Indo-Austral. Archipel., p. 269, 1923.

Eye large, prominent, its diameter greater than its distance from the nostril; head triangular in shape; snout obtusely pointed; nostrils a little nearer the tip of the snout than the eye; canthus rostralis angular; loreal region feebly oblique, feebly concave; interorbital width greater than that of the upper eyelid; tympanum distinct, not quite half the diameter of the eye. Fingers with discs as large as the tympanum; the inner one feebly opposed to the outer three; outer two fingers ⅔ webbed, inner two webbed at the base. Toes nearly entirely webbed, their discs smaller than those of the fingers; outer metatarsals separated nearly to the base; subarticular tubercle moderately developed; a feeble inner metatarsal tubercle; no outer tubercle; the tibiotarsal articulation reaches to beyond the tip of the snout.

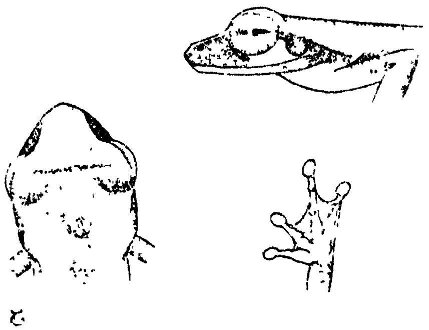

Fig. 8. Head and hand of *Philautus bimaculatus.*

Skin smooth with occasional small tubercles; belly and hinder part of thighs granulate.

Violet-brown above, uniform or with irregular spots and blotches; dark crossbars on the limbs, a dark bar between the eyes and yellowish-white blotches on the lips below the eyes; lower parts dirty-whitish. Male with a subgular vocal sac opening by a large slit on either side of the tongue.

From snout to vent 34 mm.

Peters' original description, which appears to have been copied by subsequent authors without reference to the type, differs from the above in several important points.

The above description is drawn up from the type in Berlin, a specimen from Sarawak in the British Museum collection and two more obtained in Peninsular Siam, one near Setun, S. W. of Patelung and the other from Tasan, near Chumporn. The drawing is from the last named, which is now in the national collection.

Philautus horridus.

Ixalus horridus, Boulenger, p. 256.

The range of the species extends to the Mentawi Islands (Ann. Mag. Nat. Hist., (9) XVIII, 1926, p. 80).

Family **Brevicipitidae.**

Engystomatidae, p. 257.

Dyscophidae, Boulenger, Fauna Brit. Ind., p. 498 (1890).

I. Upper jaw toothed.

A transverse series of vomerine teeth behind the choana ... ... *Calluella.*

II. Both jaws toothless.

A. Procoracoids present, clavicles absent.

Vomer forming a sharp transverse ridge behind the choana; fingers free; metatarsal tubercles large, rounded ... *Kaloula.*

A transverse dermal ridge behind the choana; fingers webbed at the base; metatarsal tubercles very large, flat ... *Phrynella.*

B. Procoracoids and clavicles absent.

No ridge behind the choana; fingers free ... *Microhyla.*

C. Clavicles present.

A transverse dermal ridge behind the choanae[*] and one of two in front of the pharynx; digits not dilated ... ... *Kalophrynus.*

No dermal ridge behind the choana; one or two in front of the pharynx; digits with distinct discs ... ... *Sphenophryne.*

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[*] The figure on p. 257 of the Fauna shewing an uninterrupted ridge across the plate is incorrect.

Genus **Calluella**

Calluella Stoliczka, Proc. Asiat. Soc. Bengal, 1872, p. 146; Boulenger, Fauna Brit. Ind., p. 498 (1890), fig.

Pupil diamond-shaped; tongue oval, entire and free behind. Vomer with a transverse series of teeth behind the choana; two cutaneous transverse folds in front of the pharynx. Tympanum hidden. Fingers free, toes webbed, the tips not dilated; outer metatarsals united. Coracoids strong; clavicles weak, curved, lying close to the coracoids; no omosternum; sternum a large two-headed cartilaginous plate. Diapophyses of sacral vertebra moderately dilated; terminal phalanges simple.

A single species in the Peninsula.

Whether the tooth-bearing bone in the region of the palate represents the vomer and palatine bones which have fused with one another, or the vomer only, the palatine having disappeared, it is difficult to say. Judging from analogy with other Brevicipitids it would seem correct to regard the toothed bone in *Calluella* as vomer and not palatine.

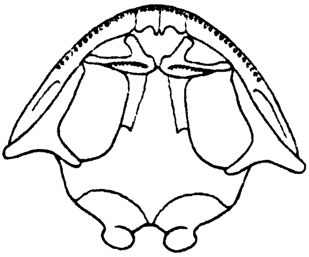

Fig. 9. Skull of *Calluella guttulata* (lower aspect).

Calluella guttulata.

Megalophrys guttulata Blyth, Journ. Asiat. Soc. Bengal, XXIV, 1855, p. 717.

Calluella guttulata, Boulenger, Fauna Brit. Ind., p. 498 (1890); M. A. Smith, Journ. N.H.S. Siam, II. 1917, p. 270, fig. (tadpole).

Head short, nearly twice as broad as long, snout broadly rounded; nostrils equidistant from the eye and the tip of the snout, the distance between them equal to the interorbital width which is greater than that of the upper eyelid. Fingers moderate, first shorter than second; toes moderate, about ⅓ webbed; subarticular tubercles well developed; inner metatarsal tubercle large, shovel-shaped; outer tubercle much smaller, rounded; the tarso-metatarsal tubercle reaches the eye.

Skin smooth, with or without soft rounded tubercles upon the back. A fold across the head behind the eyes usually present.

Colour very variable. Olive, grey, greenish, yellow or brown, with large, dark, light edged spots of sinuous outline usually present; a dark band behind the thighs enclosing the vent; limbs with dark cross-bars. Young specimens have more often a single large dark blotch upon the back terminating in a **Y**-shaped mark connecting with the eyes. Below yellowish or whitish.

Male with a subgular vocal sac, which becomes black in the breeding season.

From snout to vent (♀) 48 mm.; (♂) 45 mm.

Description of the tadpole. Length of head and body 1⅓ times its breadth, snout broadly rounded; nostrils midway between the eyes and the tip of the snout. Eyes perfectly lateral, 4 or 5 times as far apart as the nostrils. Tail 4 to 5 times as long as high, ending in a fine point; crests low, almost straight, the upper one-half the height of the lower.

Pale greenish, greyish or brownish, more or less translucent, sometimes almost colourless. Some dark patches of pigment at the nostrils, between the eyes, and at the base of the tail; posterior part of tail black.

Total length 40 mm.; head and body 12 mm.

The tadpoles assume an oblique position in the water; they congregate in large colonies, all the individuals composing it being closely packed together with their heads turned in the same direction.

Range. Southern Burma and the northern part of the Malay Peninsula. Robinson and Kloss obtained two specimens at Tasan (Isthmus of Kra) and I have seen another from Chumporn.

Genus **Kaloula.**

Callula, p. 263.

Kaloula Gray, Zool. Miscell., p. 38 (1831).

Pupil round or diamond-shaped, tongue oblong, entire and free behind. Vomer forming a sharp, transverse ridge behind the choana; palatine much reduced, its inner extremity underlying the vomer. Two transverse dermal, more or less denticulated, ridges in front of the œsophagus. Tympanum hidden. Fingers free; toes free or webbed; tips of fingers and toes more or less dilated. Outer metatarsals united.

Procoracoids small, subtriangular in shape; omosternum small, sternum large, both cartilaginous. Diapophyses of sacral vertebrae moderately dilated.

Range. The greater part of the Oriental region.

Two species in the Peninsula.

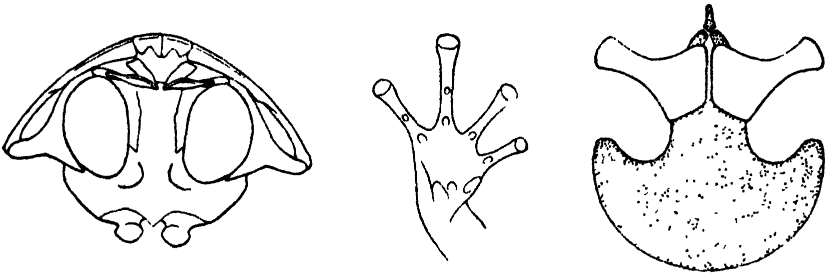

Fig. 10. Skull (lower aspect) hand and sternal apparatus of *Kaloula pulchra*.

Discs of fingers moderately large, their width not twice that of the narrowest part of the penultimate phalanx; toes webbed at the base	*pulchra*.
Discs of fingers very large, their width more than twice that of the narrowest part of the penultimate phalanx; toes at least ⅓ webbed.	*baleata*.

Kaloula pulchra.

Callula pulchra, Boulenger, p. 264; M. A. Smith, Journ. N.H.S. Siam, II. 1916, p. 40, fig. (tadpole)

Kaloula pulchra, Annandale, Mem. Asiat. Soc. Bengal, VI. 1917 p. 152, fig. (tadpole).

Tadpole. Length of head and body 1½ times its breadth, snout very broadly rounded. Eyes six times as far apart as the nostrils. Tail twice as long as the head and body, with obtusely pointed tip; crests moderate, sub-equal.

Dark olive-brown to black, usually finely speckled with gold.

Total length 40 mm.; head and body 14 mm.

Kaloula baleata.

Bombinator baleatus S. Muller, Verh. Batav. Gen., XVI, 1836, p. 96.

Kaloula baleata. van Kampen, Amphib. Indo-Austral. Archipel., 1923, p. 148. fig; M. A. Smith, Journ. F. M. S. Mus., X. 1922, p. 282 (Kuala Tahan).

Head much broader than long; snout short, rounded, as long as, or a little shorter than, the upper eyelid; canthus rostralis rounded; loreal region oblique; nostril nearer the tip of the snout than the eye; interorbital space broader than the upper eyelid. Tips of fingers with large, triangular disks; their breadth more than twice that of the narrowest part of the penultimate phalanx; first finger shorter than second; tips of toes feebly dilated, third toe distinctly longer than the fifth; toes at least one-third webbed; subarticular tubercles distinct; two metatarsal tubercles, the inner large, compressed, with blunt edge, the outer smaller; the heel reaches the shoulder (in the adult) or the eye (in the young).

Upper parts smooth, or with small, flat warts; a fold from the eye to the shoulder; lower parts smooth, throat finely granulate.

Brown, olive or blackish above, uniform or variegated with darker; a few large, whitish (red in life) spots on the armpits, loins and limbs; below whitish, variegated with brown.

From snout to vent 76 mm.

Male with a subgular vocal sac.

Tadpole similar to that of *K. pulchra.*

Range. Malay Peninsula and Archipelago.

The F. M. S. Museums obtained a single specimen at Kuala Tahan.

Genus **Phrynella**

Phrynella, Boulenger, p. 265.

Kaloula, M. A. Smith, Ann. Mag. Nat. Hist., (9) XVIII. 1926, p. 81

Pupil diamond-shaped. Tongue oblong, free behind. A transverse dermal ridge behind the choana and two, more or less denticulated, transverse ridges in front of the œsophagus. Tympanum hidden. Fingers webbed at the base, with very large flat, subarticular tubercles; toes webbed; tips of fingers and toes strongly dilated. Vomer much reduced, only the anterior portion being present; no palatine bone. Procoracoids very small, subtriangular in shape; omosternum and sternum cartilaginous.

A critical examination of the skulls of *Phrynella** and *Kaloula** shew that they differ so much as regards the vomer and palatine bones, that my grounds for uniting the two genera (1926) must be abandoned.

Key to the Species

Toes at least ¾ webbed	*pulchra.*
Toes hardly ¼ webbed; male with a strong tubercle-like rudiment of pollex	*pollicaris.*

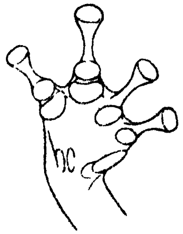

Fig. 11. Hand of *Phrynella pulchra.*

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*The genotypes *Phrynella pulchra* and *Kaloula pulchra* examined.

Phrynella pulchra.

Phrynella pulchra, Boulenger, p. 265; M. A. Smith, Journ. F. M. S. Mus., X. 1922, p. 282 (Kuala Tahan).

Kaloula boulengeri, M. A. Smith, Ann. Mag. Nat. Hist., (9) XVIII. 1926, p. 81.

Phrynella pollicaris, Boulenger, p. 266.

Five specimens were obtained in the Cameron's Highlands by the F. M. S. Museums in 1923 at an altitude of 5,000 feet.

Colour in spirits. Dark purplish brown above, uniform or with faint yellowish mottlings upon the hind-limbs; paler below.

In the two males the prepollex projects through the skin as a sharp, pointed spike, a condition which probably occurs only at the nuptial period.

The females have small darkly-pigmented ova.

Genus **Kalophrynus**

Calophrynus, p. 257.

Kalophrynus Tschudi, N. Class. Batr., 1838, p. 86.

KEY TO THE SPECIES

Fourth finger normally developed .. ... *pleurostigma.*
Fourth finger very short ... ... *robinsoni.*

Kalophrynus pleurostigma.

Calophrynus pleurostigma, Boulenger, p. 258.

It is recorded that this species "lives in small holes in tree-trunks, often at a considerable height from the ground (p. 258)". In the absence of any digital adaptation for climbing, I doubt if this statement is correct. All those I have met with were on the ground

Kalophrynus robinsoni.

M. A. Smith, Journ. F. M. S. Mus., X. 1922, p. 280.

Dermal ridge across the palate behind the choanae obtusely **V**-shaped and interrupted in the middle.

Tongue elliptic, entire. Snout short, truncate, projecting slightly beyond the mouth; canthus rostralis distinct, loreal region vertical, feebly concave; interorbital region broader than the upper eyelid; tympanum usually distinct, two-thirds the diameter of the eye. First and second fingers very short, not half the length of the third, fourth shorter still; toes one-third webbed, the web extending as a fringe along the outer sides of the toes; fifth toe shorter than the third; tips of fingers and toes bluntly pointed; a feebly developed oval inner metatarsal tubercle and a rounded outer one. The tibio-tarsal articulation reached the tympanum.

Skin of the back granular, with small scattered tubercles; a series of tubercles along the dorsolateral region from the eye to the groin and another along the hinder side of each thigh; belly and groin with large coarse granules; throat with finer granules; a curved fold from the eye to the shoulder.

Light brown, sometimes with a pink tinge above, with dark brown markings. in particular a large one on the back extending forwards in two branches to the eyelids, and backwards, in two longer branches to the groins; sides of head and body very dark brown. this colour sharply defined from the light brown of the back; limbs with dark cross bars, and a dark patch enclosing the vent and extending along the back of the thighs. Below yellowish, spotted and speckled with brown.

From snout to vent 17 mm.

Type locality Wray's Camp, Gunong Tahan. A specimen has also been obtained at Kuala Teku.

Genus **Sphenophryne** (*see* note, p. 135).
Microhyla (part), p. 258.

Sphenophryne Peters & Doria, Ann. Mus. Civ. Genova, XIII. 1878. p. 430.

Chaperina, Mocquard; Mem. Soc. Zool. France, V. 1892, p. 194.

Pupil horizontal. Tongue entire or feebly nicked and free behind. Palate toothless. One or two transverse dermal ridges in front of the œsophagus. Tympanum distinct or hidden. Fingers free, toes free or webbed at the base, with discs. Outer metatarsals united. Precoracoids and clavicles present, the latter reaching the scapulae; no omosternum.

Range. The Malay Peninsula and Archipelago; New Guinea; Northern Queensland.

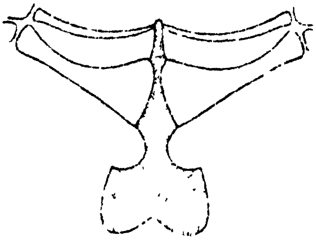

Fig. 12. Pectoral girdle of *Sphenophryne fusca.*

Sphenophryne fusca.

Chaperina fusca, Mocquard, Mem. Soc. Zool. France, V. 1892, p. 194, figs.

Microhyla leucostigma, Boulenger, p. 260.

Sphenophryne leucostigma, M. A. Smith, Journ. Sarawak Mus., III, 1925, p. 12.

The history of this small frog has been given in the Journal of the Sarawak Museum.

Dr. Van Kampen has pointed out a slip of mine in naming it *leucostigma*, Mocquard's name *fusca* having priority over Boulenger's by seven years.

Boulenger's description (p. 260) omits mention of the dermal spines on the heels and elbows.

There are tadpoles of this frog in the British Museum collected by Mr. J. Hewitt at Kuching, N. Borneo, one specimen of which is sufficiently developed to confirm the identification with tolerable certainty. They differ entirely from the tadpole of *Chaperina beyeri* (=*Sphenohryne fusca*), which has been described by Taylor in having a sinistral spiraculum and a ranid type of mouth (Philippine Amphibia, 1920, p. 34), neither of which characters have so far been associated with the brevicipited larvae.

The following description is drawn up from Mr. Hewitt's tadpoles —Length of head and body 1½ to 1¾ times its breadth, considerably depressed; snout very broadly rounded. Eyes superolateral, the distance between them twice that between the nostrils, which are midway between the tip of the snout and a line drawn between the eyes. Spiraculum ventral the opening being in the mid-line at the junction of the anterior three-quarters and the posterior one-quarter of the head and body. Mouth terminal, without horny beak or labial teeth, consisting of a simple upper and lower lip, the latter being composed of a transverse flap which appears to represent the true lip, and an internal notched portion which is joined at its apex to the transverse part in the mid-line Anus dextral. Tail 1½ times as long as the head and body, the tip obtusely pointed; crests moderate, sub-equal Colour olive brown, paler below. Total length 24 mm., head and body 9 mm.

Genus **Microhyla**

Boulenger, p 258; Parker, Ann Mag. Nat Hist, (10) II, 1928, p. 473

Parker has recently reviewed this genus very completely. His findings shew that a complete orthogenetic series can be traced from the most primitive forms (*M. berdmorei* and its allies) in which the palatine bone is well developed, the digital discs large with **T**-shaped terminal phalanges and the toes fully webbed, to *M. inornata* in which the palatine has completely disappeared, the digital extremities are merely swollen with simple terminal phalanges, and the toes entirely free of web.

Tadpoles with lateral eyes, median-ventral spiraculum and a terminal mouth, which is provided with a small upper and a contractile lower lip; no horny jaws or teeth. Tail usually terminating in a fine filament. The toes are fully webbed in the larval state. The food of these creatures consists of minute organisms suspended in the water, except in the case of *M. heymonsi* and *M. achatina* which feed by suction at the surface.

Two species are added to the fauna of the peninsula. *M. pulchra* (Hallow) has been obtained at Patiyu just north of the Isthmus of Kra, and probably occurs in the region included in this work.

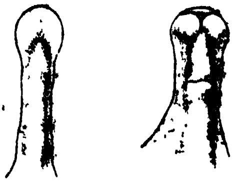

Fig. 13. Digital extremities of *Microhyla palmipes* and *M. berdmorei.*

KEY TO THE SPECIES

I. Tips of toes with distinct discs, the upper surface of which is divided from the lower by a marginal groove.

A. Upper portion of disc with a median notch in front.

Toes webbed to the discs; two metatarsal tubercles. A palatine bone ... ... *berdmorei.*

Toes $\frac{2}{3}$ to $\frac{3}{4}$ webbed; no outer metatarsal tubercle; first finger less than half the length of second. A palatine bone ... ... *annectens.*

Toes $\frac{1}{3}$ webbed; two metatarsal tubercles; a dark Λ-shaped mark on the back. A palatine bone ... ... *butleri.*

Toes webbed at the base; two metatarsal tubercles; a continuous dark band along the side of the body. No palatine bone ... ... *heymonsi.*

B. No notch on the upper half of the disc.

Toes $\frac{2}{3}$ – $\frac{3}{4}$ webbed; no superciliary spine; fingers with distinct discs. A palatine bone ... *palmipes.*

Toes nearly fully webbed; a dermal spine on the upper eyelid; fingers without discs. A palatine bone .. .. *superciliaris.*

II. Tips of toes merely swollen.

Toes with a rudiment of a web: two metatarsal tubercles; back with a large V-shaped mark, more or less distinct. No palatine bone ... *ornata.*

Toes free; a single metatarsal tubercle; back uniform or with irregular black spots. No palatine bone ... ... *inornata.*

Microhyla berdmorei.

Boulenger, p. 263; M. A. Smith, Journ. F. M. S. Mus., X. 1922, p. 28 (Pahang) and Rec. Ind. Mus. XXVI. 1924, p. 141, pl. VII; Parker, Ann. Mag. Nat. Hist., (10) II, 1928, p. 479.

Tadpole. Head and body together squarish in shape, only a little longer than broad. Eyes eight times as far apart as the nostrils. Tail not more than twice the length of the head and body, not terminating in a filament; crest low, subequal.

Total length 23 mm.; head and body 9 mm.

Colour greyish or brownish, semitranslucent.

Microhyla annectens

Boulenger, p. 262; Parker, Ann. Mag. Nat. Hist., (10) II, 1928, p. 482.

I have seen a specimen from Patiyu, just north of the Isthmus of Kra.

Microhyla butleri.

Boulenger, p. 261; M. A. Smith, Journ. N.H.S. Siam, II, 1917, p. 268 (tadpole) and Journ. F. M S. Mus., X, 1922, p. 281 (Pahang); "Transparent tadpoles" Flower P.Z S. 1899, p. 903, pl. LX; Parker, Ann. Mag. Nat Hist., (10) II, 1928, p. 483

Tadpole. Length of head and body about 1½ times its width. Nostrils close together on the upper surface of the head; distance between the eyes about 6 times that between the nostrils.

Tail about three times as long as high, terminating in a fine filament. Crests well developed, curved in outline, the lower one higher than the upper.

Head and body semitransparent, finely speckled with brown. Crests of the tail reddish-brown or scarlet, the coloration terminaing abruptly with a margin of dark, sometimes black pigment, before the end of the tail is reached.

The range of this frog extends into Burma (S. Shan States).

Microhyla heymonsi.

Microhyla achatina, (part), Boulenger, p. 261; *Microhyla achatina*, M. A. Smith, Journ. N.H.S. Siam, II. 1916, p. 37, fig (tadpole) & p 169; Robinson and Kloss, Journ. F. M. S. Mus., V. 1915, p. 155.

Microhyla heymonsi Vogt., SB Ges. Nat. Fr. 1911, p. 181; Parker, Ann. Mag Nat Hist., (10) II, 1928, p. 487.

Parker has shewn that the true *achatina* is confined to Java and the form which is found in the Malay Peninsula and over the greater part of the Indo-Chinese region is *heymonsi*. It was first described from specimens obtained in Formosa.

Tadpole. Length of body 1¾ to nearly 2 times its breadth. Distance between the nostrils about ¼ the distance between the eyes. Tail twice the length of the head and body, 3 to 4 times as long as high, the tip terminating in a fine filament; crests moderate, subequal.

Lower lip greatly enlarged forming when elevated a cup-shaped receptacle into which are drawn by suction all minute particles of matter which happen to be floating on the surface of the water in the vicinity.

Brownish, with a gold spot on the head between the eyes and often gold or orange patches on the sides of the body and tail.

Total length 22 mm.; head and body 7 mm.

Microhyla palmipes.

Microhyla annectens (part), Boulenger, p. 262

Microhyla palmipes, Boulenger, Ann. Mag. Nat. Hist., (6) XIX, 1897, p. 108: Parker. Ann. Mag. Nat. Hist., (10 II, 1928, p. 485

Microhyla berdmorei, M. A. Smith, Journ. F. M. S. Mus., X, 1922, p. 281.

Habit slender. snout rounded, slightly prominent, as long as or slightly longer than the diameter of the eye; interorbital space broader than the upper eyelid. Tips of fingers and toes dilated into small but distinct discs with a marginal groove separating the upper and lower surfaces; no notch on the upper surface; fingers slender, first much shorter than second which is about equal to the fourth; toes $\frac{2}{3}$ to $\frac{3}{4}$ webbed; two metatarsal tubercles; the tibiotarsal articulation reaches to the tip of the snout or just beyond. Skin smooth or slightly tubercular above; usually a small tubercle on the posterior half of the upper eyelid.

Greyish or purplish-brown above, with symmetrical dark, light-edged markings, namely a triangle between the eyes connecting with a large Λ -shaped mark on the back; a dark oblique band from the eye to the middle of the flank; anal region black; limbs with dark cross-bars, usually two across the thigh, one across the tibia and one on the tarsus; lower parts whitish or brownish.

From snout to vent 18 mm.

Range. Java, Nias, Sumatra and the Malay Peninsula, where it has been found in the Batu Caves at Kuala Lumpur.

Microhyla superciliaris.

Parker, Ann. Mag. Nat. Hist., (10) II, 1928, p. 486.

Habit slender. Snout rounded, slightly prominent, slightly longer than the diameter of the eye. Tips of digits dilated; of the fingers scarcely at all, of the toes larger, with a marginal groove separating the upper and lower surfaces; no notch on the upper half of the disc. First finger much shorter than the second, which is about as long as the fourth; third finger twice or more than twice as long as the second; toes slender, almost fully webbed, the membrane extending to the discs of all except the fourth; subarticular tubercles, scarcely distinct; two metatarsal tubercles. The tibiotarsal articulation reaches to the tip of the snout. Skin smooth above and below; a prominent dermal spine on the upper eyelid.

Colour in alcohol (specimen rather bleached). Yellowish-brown above with indications of a dark Λ-shaped mark on the back, its apex on the shoulders; a dark oblique streak from the eye to the middle of the flank; anal region black; limbs with dark cross-bars, namely two across the thigh, one across the tibia and one on the tarsus; lower parts whitish.

From snout to vent 12 mm.

Type specimen, a female, was collected in the Batu Caves, Kuala Lumpur in 1904. There is a second female specimen in the Museum of Zoology, Amsterdam, collected at Deli, Sumatra.

Microhyla ornata.

Boulenger, p. 260, Parker, Ann Mag. Nat. Hist., (10) II, 1928, p. 493.

Microhyla inornata.

Boulenger, p. 259, M. A. Smith, Rec. Ind. Mus., XXVI. 1924, p. 141 (tadpole); Parker, Ann. Mag. Nat. Hist., (10) II, 1928, p. 498.

The tadpole is indistinguishable from that of *M. ornata*.

Range. Southern Burma, Siam, Cochin-China, the Malay Peninsula and Sumatra. Parker unites the Formosan *M. stejnegeri* with this species.

Family **Bufonidae**

Genus **Nectophryne**

Nectophryne guentheri, Boulenger, p. 268.

Nectophryne hosii, Boulenger, p. 268.

My native collector found this toad common in the vicinity of the Setun river (Lat. 7° 40 N.) and obtained a large series. He was attracted to the spot after dark by the voices of the males as they were clambering about on bushes and small trees.

Genus **Bufo**

One species, *B. macrotis*, is added. *B. jerboa* becomes *B. borbonica*.

Bufo penangensis.

Boulenger, p. 270; M. A. Smith, Journ. F. M S. Mus., X. 1922, p. 282 (Kuala Teku).

Robinson and Kloss found this species common at Tasan (Isthmus of Kra) and I obtained it at Benang Star in Patani, and in the Nakon Sritamarat mountains.

The tadpole is figured on p. 111 (text-fig. 6).

Bufo borbonica.

Hylaplesia borbonica, Kuhl & van Hasselt, Isis, XX. 1827, p. 294.

Nectophryne borbonica, van Kampen, Amphib. Indo-Austral. Archipel., p. 70 fig. (1923).

Bufo borbonica, M. A. Smith, Journ. Sarawak Mus., III. 1925, p. 30. (*jerboa = borbonica*).

Bufo jerboa, Boulenger, p. 271.

I have examined a large series of this toad from Kuan Nieng. S. W. of Patelung.

My reasons for placing it under *Bufo* rather than under *Nectophryne*, as van Kampen has done, have already been given (1925).

Dr. van Kampen has kindly compared for me specimens of *Bufo jerboa* with the types of *Hylaplesia borbonica* and confirms my opinion that the two should be united.

Bufo macrotis.

Boulenger, Fauna Brit. India, p. 502 (1890); M. A. Smith, Journ. N.H.S. Siam, II. 1916, p. 169 (Patani).

Habit moderately stout. Crown without bony ridges; snout short truncate; interorbital space flat, as broad as the upper eyelid; canthus rostralis distinct; loreal region oblique; tympanum very distinct, vertically oval, quite as large as the eye and close to it.

Tips of fingers and toes swollen; first finger as long as or a little longer than second; toes barely half webbed with irregular spinose tubercles beneath, from which the subarticular tubercles are hardly distinguishable; two small metatarsal tubercles, the outer the larger; the tarsometatarsal articulation reaches to the tympanum or the eye.

Upper parts studded with round tubercles of various sizes; parotids prominent, subcircular.

Brownish or greyish above with irregular darker markings and occasional jet black spots; upper lip and limbs with indistinct dark bars present or absent. Lower surfaces dirty white, uniform or spotted with brown.

From snout to vent 52 mm.

Male with a subgular vocal sac, and black asperities on the inner two fingers during the breeding season.

Range. Burma, Siam and the northern part of the Malay Peninsula. A single example has been obtained at Muang Sai, Patani.

Easily distinguished from the other two species in the Peninsula that have no bony ridges on the head by the stouter habit and much shorter hind limbs and prominent parotid glands.

Bufo asper.

Boulenger, p. 272; van Kampen, Nat. Tijdschr. Ned-Indie, LXIX, 1910, pp. 26, 30, pl. II (tadpole); M. A. Smith, Journ. N.H.S. Siam, II. 1916, p. 170 (P. Siam) and Journ. F. M. S. Mus., X. 1922, p. 283 (Pahang).

Tadpole. Length of head and body about 1½ times its breadth; nostrils nearer the eye than the tip of the snout; eyes superolateral, their interspace about 1½ times the distance between the nostrils; spiracle sinistral, directed backwards, midway beween the eye and the vent, which is medium. Tail 1½ times as long as the head and body, with rounded tip; crests low. the upper a little deeper than the lower, not reaching the base of the tail. Mouth ventral, very large, shaped like a sucker, sides and lower lip with a single series of short papillae; mandibles edged with black, the upper M-shaped; upper lip with two uninterrupted series of teeth; lower lip with three series, its posterior portion which is unarmed extending backwards nearly to the middle of the body.

Length 20 mm. Colour blackish.

This description of the larva is taken from van Kampen (1910). Three tadpoles without budding hind-limbs which I assign to *Bufo asper* were obtained by Mr. C. Dover in Sungei Ampang, Selangor in 1926 (see text fig. 6, p. 111).

Robinson and Kloss found this toad abundant at Tasan (Isthmus of Kra). It is common also in the Nakon Sritamarat mountains.

Bufo melanostictus, Boulenger, p. 272.

Bufo parvus.

Boulenger, p. 274; M. A Smith, Journ. N H.S Siam, II. 1916, p. 42, fig. (tadpole) and p. 170 (P. Siam) and Journ. F. M S. Mus, X, 1922, p. 283 (Kuala Tahan).

Tadpole. Length of head and body 1⅓ to 1½ times its breadth: eyes superolateral, the distance between them twice that between the nostrils. Tail 1⅓ times the length of the head and body, 3 times as long as high, the tip rounded: crests moderate, subequal

Mouth subterminal; beak edged with black; upper lip with 2 and lower lip with 3 long series of uninterrupted teeth.

Length 25 mm.; head and body 10 mm. Colour blackish

Bufo quadriporcatus, Boulenger, p. 274.

Bufo divergens, Boulenger, p. 275.

Genus **Pseudobufo**

Nectes, p. 275.

Pseudobufo Tschudi, Mém. Soc. Sc. Neuchatel, II. 1839 pp. 40, 87; Nieden, SB. ges. nat. Fr. Berlin, 1914, p. 369.

Pseudobufo subasper.

Nectes subasper, Boulenger, p. 275; van Kampen, Amphib. Indo-Austr. Archipel., 1923, fig. 10.

Family **Pelobatidae**

Genus **Megophrys**

Megalophrys, p. 276.

Megophrys, Khul en van Hassett, Isis, 1822, p. 475.

M. montana var. *aceras* Boulenger, I regard as a distinct species.

The tadpoles of this genus can be sharply divided into two groups, namely, those with horny mandibles and teeth of the ranid type and those without mandibles and teeth, but with the lips modified to form a cup-shaped orifice by which they obtain their food by suction from the surface of the water. The function of this "funnel" has been recently discussed by me in P.Z.S. 1926, pp. 983-987.

Megophrys nasuta.

Megalophrys nasuta, Boulenger, p. 279: M. A. Smith, Journ. F. M. S. Mus., X. 1922, p. 282 (Wray's Camp).

Patani at present marks the northern range of this species.

Megophrys longipes.

Megalophrys longipes, Boulenger, p. 280; M. A. Smith, Journ. F. M S. Mus., X, 1922, p. 282 (Fraser's Hill).

Two specimens were captured on Khao Luang in the Nakon Sritamarat mountains at 4,000 feet altitude.

Megophrys aceras.

Megalophrys montana var. *aceras*, Boulenger, Fascic Malay., Zool. I. p. 131, pl. V (1903).

Megalophrys montana (part), Boulenger, Fauna, p. 277.

Megalophrys aceras, M. A. Smith, P.Z.S. 1926, p. 987

Tongue entire or feebly nicked behind; vomerine teeth in prominent rounded groups extending to behind the level of the choanae widely separated from each other. Head 1⅓ to 1½ times as broad as long; snout obtusely pointed, strongly projecting beyond the lower jaw, as long as the eye; canthus rostralis sharply defined; loreal region vertical, slightly concave; nostril nearer the tip of the snout than the eye; interorbital region concave, broader than the upper eyelid; tympanum very distinct, ¾ the diameter of the eye.

Fingers and toes rather long, the tips swollen; first finger longer than the second; no distinct subarticular or metacarpal tubercles. Toes webbed at the base; an oval flat inner metatarsal tubercle, ¾ the length of the inner toe; a dermal fringe along the under surface of the fingers and toes usually present.

The tibiotarsal articulation reaches to between the tympanum and the eye in the adult, a little farther in the young.

Skin smooth with fine, scattered tubercles, those on the flanks longer than those on the back. A fine glandular **V**-shaped fold upon the neck and usually another opposing it on the back; a fine fold along the side of the body from the tympanum to the groin; a strong, curved supratympanic fold, continued along the border of the upper eyelid where it is produced into a small horn, and along the canthus rostralis to meet its fellow of the opposite side in a distinct tip.

Bronze brown or greyish above with darker markings, the most conspicuous being a triangular patch between the eyes; flanks and hinder side of limbs with black spots; an irregular black band along the back of the thigh enclosing the anus; limbs with dark cross bars. Yellowish below, the throat and chest marbled with brown.

From snout to vent ♀ 83 mm., ♂ 57 mm.

Tadpoles of the "funnel-mouth" form.

Range. The Malay Peninsula (Patani, Nakon Sritamarat).

Distinguished from *M. monticola* by the narrow head, larger and more distinct tympanum and feebler web to the toes.

As stated by me in P.Z.S. 1926, *M. montana* has now no place in the fauna of the Peninsula.

Megophrys gracilis.

Megalophrys gracilis, Boulenger, p. 281.

Megophrys heteropus.

Megalophrys heteropus, Boulenger, p. 281.

Megophrys pelodytoides.

Megalophrys pelodytoides, Boulenger, p. 282; M. A Smith, Journ. N.H.S. Siam, II. 1917. p. 272, fig. (tadpole).

Tadpole. Length of head and body 1¾ to 2 times its breadth, considerably depressed. Eyes superolateral, a little farther apart than the nostrils. Tail twice as long as the head and body, 4 to 5 times as long as high, the tip obtusely pointed; crests low, subequal.

Mouth subterminal, entirely surrounded with papillae; beak black; upper lip with 5 or 6 series of teeth, the outer very short, the second much longer and narrowly interrupted, the remaining 3 or 4 broadly interrupted; lower lip with 4 series, the outer uninterrupted.

Light or dark brown, speckled and spotted with black.

Total length 63 mm.; head and body 21 mm.

Megophrys hasseltii.

Megalophrys hasseltii, **Boulenger**, p. 282.

Tadpole. Length of head and body 1½ times its breadth, moderately depressed. Eyes superolateral, about twice as far apart as the nostrils. Tail 1½ to 2 times the length of the head and body, 3 to 4 times as long as high, the tip obtusely pointed. Crests moderate, the upper a little higher than the lower.

Mouth subterminal, surrounded with papillae except for a small gap in the midline above. Beak black; upper lip with 6 or 7 series of teeth, the outer short, the second much longer, the remainder interrupted by the beak; lower lip with 5 or 6 series, the inner 3 of which are paired.

Colour (of specimens in the Peninsula). Dark greyish, covered all over with black, punctate dots.

Total length 46 mm.; tail 24 mm.

Order **APODA**

Family **Caeciliidae**

Ichthyophis glutinosus, Boulenger, p. 285.

Ichthyophis monochrous, Boulenger, p. 286.

NOTES

Page 36. **Lygosoma opisthorhodum.**

Description: Snout short; lower eyelid scaly; ear-opening small, round. Supranasals present, forming a median suture; frontonasal broadly in contact with the frontal; latter more than one time and a half as long as broad, in contact with the two anterior supraoculars; four supraoculars; frontoparietals and interparietal distinct; parietals forming a suture behind the latter; no temporals; fourth or fifth upper labial below the eye. Body with 30 scales round the middle, dorsals and laterals tricarinate, ventrals smooth, in 10 longitudinal series; praeanals feebly enlarged. Tail slightly longer than head and body. Limbs short, not meeting when adpressed; fourth toe with 13 lamellae below.

Blackish-brown above, posteriorly somewhat lighter; tail reddish-brown; a light stripe beginning at the frontal, passing along the upper eyelid to the flanks, where it is lost; lower labials brown. Lower parts yellowish-brown. Length of head and body 93 mm.; tail broken. (After Werner).

Page 92. **Oocidozyga laevis.**

In a forthcoming paper in the Bull. Raffles Mus. I show that *Oocidozyga laevis* is generically distinct from *O. lima* and congeneric with *Oreobatrachus baluensis* Boulenger. The name *Phrynoglossus* Peters, is available for these species and all those at present included under *Oocidozyga* except *O. lima*. *Oocidozyga* becomes a monotypic genus.

Page 124. **Sphenophryne fusca.**

In a paper not yet published Mr. H. W. Parker has recognised *Chaperina* as a monotypic genus.

Recent literature dealing with the Fauna of the Malay Peninsula.*

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Boulenger, G. A. A Monograph of the South Asian, Papuan, Melanesian and Australian Frogs of the Genus *Rana*. Rec. Ind. Mus., XX. 1920.

Chasen, F. N. On the Introduction of an Australian Scink into Singapore Island. Journ. Malayan Br. Royal Asiat. Soc., III. 1925, pp. 100 - 101.

Cochran, Doris. Description of a new species of Agamid Lizard from the Malay Peninsula. Proc. U. S. Nat. Mus., Washington, 60, 1922, pp. 1 - 3.

Kloss, C. Boden. On two snakes new to the Fauna of the Malay Peninsula. Journ. F. M. S. Mus., VI, 1915, pp. 41 - 42.

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Parker, H. W. The Brevicipitid Frogs of the Genus *Microhyla*. Ann. Mag. Nat. Hist., (10) II, 1928, p. 473.

Robinson and Kloss. Reptiles and Batrachians from Bandon, Koh Samui and Koh Pennan. Journ. F. M. S. Mus., V. 1915, pp. 153 - 155.

———. The Natural History of Kedah Peak: Reptiles and Batrachians. Journ. F. M. S. Mus., VI, 1916, pp. 243, 244.

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On a Collection of Birds from the Lowlands and Islands of North Borneo.

By F. N. CHASEN *and* C. BODEN KLOSS

When I selected the lowlands of British North Borneo and the islands off its northern extremity as the scene of our major collecting enterprise for 1927 it was, as far as the birds were concerned, not so much in the hope that the visit would result in the discovery of undescribed races (for the area, with the northern part of Sarawak, was once of some prominence ornithologically and had apparently been well examined) but for the reason that good material was a desideratum for our study collection.

In my expectation as to a lack of novelties I was agreeably mistaken: among the 211 forms obtained we have already thought it desirable to describe and name sixteen as new.* They are:—

1. Ceyx erithacus motleyi
2. Chalcites xanthorhychus bangueyensis
3. Calorhamphus fuliginosus tertius
4. Chrysophlegma mentale saba.
5. Blythipicus rubiginosus parvus
6. Meiglyptes tukki pulonis
7. Rhinomyias olivacea perolivacea
8. Alophoixus phaeocephalus connectens
9. Pycnonotus plumosus insularis
10. Pycnonotus simplex perplexus
11. Malacocincla sepiaria harterti
12. Pellorneum capistratum morrelli
13. Anuropsis malaccensis sordidus
14. Orthotomus atrogularis humphreysi
15. Dissemurus paradiseus banguey
16. Dicaeum trigonostigma dayakana

but it now appears necessary to reduce *Anuropsis malaccensis sordidus* to a synonym of *Brachypteryx poliogenis* Strickland.

---

*Described in "Some new Birds from North Borneo" *by* F. N. Chasen *and* C. Boden Kloss; Journal für Ornithologie, 1929, Band 2, pp. 106—121 (Festschrift für Ernst Hartert).

Three other Bornean races are here named:—

Halcyon concreta borneana subsp. nov.
Malacopteron magnum saba subsp. nov.
Mixornis gularis argentea subsp. nov.

while in the course of our remarks on *Copsychus*, which it is hoped will settle several much debated points, we have thought it desirable to distinguish the West Javanese bird as:—

Copsychus saularis javensis subsp. nov.

We were collecting in North Borneo from 9th July to 20th September, 1927. Our main stations on the mainland were a point on the *Samawang River*, about twenty-five miles west by north of Sandakan, and *Bettotan*, about twenty-two miles west by south of Sandakan.

The bulk of the collection was made at Bettotan in heavy forest. A few skins were also collected at *Kudat* and at a point a few miles up the *Bengkoka River*, opposite to Kudat on the other side of Marudu Bay.

The three islands visited, Mallewallé, Banguey and Balambangan,* are situated off the northern extremity of Borneo. They lie outside the ten-fathom contour line, but on a bank of less than twenty fathoms which also contains the Mangsi Islands and Reefs about twelve miles north of Banguey. Deeper sea separates all these islands from Balabac Island.

Between Banguey and Borneo is a short narrow basin running east and west more than 20 fathoms deep: on the west a few soundings in it are shown up to forty-five fathoms and in the east up to twenty-seven fathoms.

Mallewallé Island (8th-9th September) is a small island six miles by four lying seven miles from the coast of Borneo.

Banguey Island (31st August—8th September) measures about ten miles by fifteen and lies about eight miles from Borneo. Our collecting ground was at the southern extremity opposite the small Patanunan Island. The highest point on the island is 1870 feet.

Balambangan Island (9th—14th September) is a low, flat island measuring fifteen by five miles but very indented. It lies three miles from Banguey and thirteen from the Bornean coast. The collecting ground was near the site of the ancient settlement of the old East India Company on the south-east coast.

In 1928 a collection was made by one of us in the south-west part of British North Borneo at *Rayoh* in the "gorge" of the Padas River which runs into Brunei Bay. Rayoh lies between the better-known townlets of Beaufort and Tenom. The Padas River runs here mostly between forested steep hills, but the altitude from which the specimens came is not great, certainly much less than 1,000 feet.

---

*The older, more familiar spelling is used; but Malawali and Banggai are better.

For the sake of completeness we have also included in this report a few skins obtained by ourselves or our collectors at *Benoni* in Kimanis Bay on the west coast; at *Kota Belud*, which is the Government station on the Tampassuk Plain a few miles from the mouth of the river of that name, and from *Gomantong* near Bilit on the left bank of the Kinabatangan River.

At the end of our notes on each species, excepting in the case of some migratory birds, we have given, in smaller type, a reference to the allied forms found in the Palawan Group and in the island of Sibutu.

Politically of course these are Philippine, but to the zoologist they are part of the Bornean province of Malaysia: they should be treated neither as an entity, nor as an integral part of the Philippines. Although the avifauna of Sibutu seems largely Philippine it includes a Bornean element and a comparison is useful

All these islands lie within the 100-fathom contour line surrounding Borneo on the North and East and are separated from the Philippine zoological area by the deep Mindoro and Sibutu Passages.

We have attempted no detailed comparison between the birds of North Borneo and those of the adjacent Philippines, but the notes given will confirm the affinities suggested by the chart.

In this paper we merely emphasize the points mentioned above as a side light on our collection from North Borneo. The credit for their discovery and exposition belongs to Everett, Sharpe, Bourns, Worcester and others.

C. Boden Kloss,

Director of Museums,

Straits Settlements and Federated Malay States.

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1879. R. B. Sharpe.—"Contributions to the Ornithology of Borneo." (Part IV). Ibis, pp. 233 - 272, pls. vii, viii.

1881. R. B. Sharpe.—"On the Birds of Sandakan, North East Borneo." Proc. Zool. Soc. Lond., pp. 790 - 800.

1883. F. Nicholson.—"On a Collection of Birds from Borneo." Ibis, pp. 85 - 90.

1885. F. H. H. Guillemard.—"Report on the Collection of Birds made during the voyage of the Yacht 'Marchesa'." (Part II. Borneo and the Island of Cagayan Sulu). Proc Zool. Soc. Lond., pp. 404 - 420, pl. xxv.

1889. R. B. Sharpe.—"On the Ornithology of Northern Borneo. with Notes by John Whitehead." Ibis.
Part i, pp. 63 - 85, pl. ii - iv.
Part ii, pp. 186 - 205, pls. vii, viii.
Part iii, pp. 265 - 283, pl. ix.
Part iv, pp. 409 - 443, pls. xii, xiii.

1890. R. B. Sharpe.—"On the Ornithology of Northern Borneo, with Notes by John Whitehead." Ibis,
Part v, pp. 1 - 24.
Part vi, pp. 133 - 149, pl. iv.
Part vii, pp. 273 - 292, pl. viii.

1890-91. D. G. Elliot.—"A List of Birds from North-east Borneo, with field notes by Mr. C. F. Adams." Auk, vii, pp. 346 - 359 and viii, pp. 7 - 40.

1893. R. B. Sharpe.—"Bornean Notes" (No. 1). Ibis, pp. 559 - 563.

1894. R. B. Sharpe.—"Bornean Notes" (No. 3). Ibis, pp. 538 - 546.

1909. R. B. Sharpe and C. Chubb.—"Notes on a Collection of Birds from Sandakan, N. E. Borneo." Ornis, xiii, pp. 137 - 161.

1925. Nagamichi Kuroda.—"On a Small Collection of Birds from British North Borneo". Tori, iv, No. 19, pp. 1 - 11.

MEGAPODIIDAE

1. Megàpodius nicobariensis cumingi Dillwyn.

Megapodius Cumingii Dillwyn, Proc. Zool. Soc., 1851, p. 119. pl. Aves. xxxix (Labuan Id.); Motley and Dillwyn, Contr. Nat. Hist. Labuan, 1855, p. 32, pl. 7.

Megapodius lowii Sharpe, Proc. Zool. Soc., 1875, p. 111 (Labuan Id.).

2 ♂, 1 ♀, 1 unsexed ad., Banguey Island; 1 ♀ Balambangan Island.

(*a*) "Iris brown; facial skin red; bill yellowish distally, dull olive-brown proximally; feet black, ankle reddish behind;"

(*b*) "sides of head scarlet; throat pink; feet black, back of tarsi olive black;"

(*c*) "feet black."

Males.—T. L. 358, 365; W. 218, 223; T. 76, 80; Ts. 64, 65; B. f. g. 29, 27 mm. (B. f. g. = *Bill from gape*).

Females.—T. L. 385, 365; W. 212, 225; T. 85, 83; Ts. 60, 61 B. f. g. 27, 28 mm. (The measurements of the Balambangan bird are given last).

Unsexed ad.—T. L. 330; W. 200; T. 72; Ts. 53; B. f. g. 27 mm.

According to one of our Dyak collectors, megapodes exist on Mallewallé Island.

Although from the context it would appear that the original description of *cumingi* was based on "the Philippine specimens brought home by Mr. Cuming" the type locality is really Labuan and not Luzon. When Sharpe described *lowii* he quite rightly considered that Dillwyn's plate was drawn from a Labuan, and not a Luzon skin but did not realize that the description of *cumingi* was of the same bird.

That this is the case was shown by Tweeddale* and subsequently admitted by Sharpe†

Some later ornithologists have overlooked this, and quite recently Bangs and Peters have separated the megapode of Maratua Island, N. E. Borneo‡ from the Philippine bird ("*M. c. cumingii*") by practically the same characters that Sharpe used to distinguish the Labuan form from the Luzon (?) race (*M. dillwyni* Tweeddale*).

Tweeddale separated the Cebu megapode under the name of *M. pusillus*: and while we think it is possible that several forms may yet be recognized in the Philippine area we doubt whether the megapodes of the coastal islands round the northern half of Borneo represent more than one race.

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*Proc. Zool. Soc., 1877, pp. 765, 766 and footnote.

†Proc. Zool. Soc., 1879, p. 349.

‡*M. c. tolutilis*, Occ. Papers, Boston Soc. Nat. Hist., 5, 1927, p. 256 (Based on a single example).

We have megapodes from Banguey, Balambangan, Mantanani and Mangalum Islands. Those from the last locality, in freshly moulted plumage, are darkest on the underparts while those from Mantanani are brownest, but some skins are so worn that bleached feathers appear as straw-yellow patches on the mantle: the birds from Banguey and Balambangan are intermediate. We doubt if these differences, which when the darkest Mangalum bird is compared with the palest Mantanani bird are very considerable, can be used to differentiate races and think that they are dependent on the state of plumage. Slight differences in colour should not receive much consideration as they are probably dependent on the time which has elapsed since the last moult took place.

M. cumingi has been recorded from Sandakan and Brunei but it is safe to assume that the birds actually came from small islands near these places and not from the mainland Some of those previously recorded from Labuan appear to have been obtained on neighbouring islets. Three birds from Mantanani have the wings ranging 215 - 220 mm. but the largest of a small series from Mangalum measures only 215 mm. Some birds from the latter locality have the back of the tarsi tinged with red.

Megapodes, probably of this form, occur in Palawan and Sibutu.

PHASIANIDAE

2. **Arborophila charltoni graydoni** (Sharpe and Chubb).

Arboricola graydoni Sharpe and Chubb, Ornis, xiii, 1906, p. 133 (N. Borneo).

5 ♂, 3 ♀ Bettotan.

"Iris brown; eyelid crimson-black or brown; maxilla olive, tip yellow, cere and base dull crimson; mandible olive, tip yellow, bas dull crimson; feet dull yellowish green, tarsi greenish ochreous" in the flesh.

Males.—T. L. 310, 280, 310, 308, 310; W. 170, 168, 166, 170, 169; T. 75, 70, 77, 67, 75; Ts. 44, 43, 44, 46, 45; B. f. g. 22, 21, 25.5, 25, 23 mm.

Females.—T. L. 280, 305, 282; W. 158, 162, 162; T. 70, 70, 70; Ts. 40, 43, 41; B. f. g. 21, 23, 22 mm.

On the upper parts this form is very like typical *charltoni* but the series is variable and it cannot be said that the Bornean birds are always darker although some are, especially on the crown. On the lower parts *graydoni* has the chestnut band across the lower throat rather deeper and less yellowish, the pale bars of the dark pectoral band and flanks conspicuously narrower and the remainder of the underparts of a richer, darker brown.

In *graydoni* the ear-coverts are variable: they may be white, largely black, buff or even tinged with rufous but they are never so highly coloured as in *charltoni*.

In the original description of *graydoni* the iris is stated to be yellow; the feet deep red and the bill black, tipped with yellow· Elliot* also recorded the feet as yellow. The details are probably taken from dry skins.

The sexes are alike.

This partridge is only known from the lowlands of North Borneo: it has not been recorded from Kina Balu and no collector seems to have met with it in Brunei or Sarawak.

It was comparatively common in the forest at Bettotan and the specimens were obtained by shooting and by means of native noose-traps ("jerat").

The note is a melodious, clearly whistled bar of several notes and the call is almost invariably answered from another point.

Tropicoperdix seems a very unnecessary division of a natural group of birds.

Arboricola graydoni and *Tropicoperdix charltoni* of Moulton's list† are the same: only one form has been shown to exist in Borneo.

No form of *Arborophila* is known from the Philippines.

3. **Rollulus roulroul** (Scop.).

3 ♂ Samawang River and Bettotan.

"Iris dark; orbital skin carmine; maxilla black, base carmine; mandible carmine, tip black; feet carmine."

Males.—T. L. 295, 282, 290; W. 142, 137, 140; T. 72, 60, 65; Ts. 49, 44, 49; B. f. g. 23, 19, 21 mm.

We cannot separate a very large series of this bird from various parts of its range, but have never seen skins from Java and doubt if the species really exists in that island.

Rollulus is not known from the Philippines.

4. **Excalfactoria chinensis** subsp.

1 ♀ Benoni.

Wing, 70 mm.

Like females from Sarawak this specimen is rather darker above and more heavily and extensively barred below than a series of the same sex from the Malay Peninsula. Our Bornean females only differ from a Luzon female (*lineata*) in being rather rufous on the head and mantle.

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*Auk, vii, 1890, p. 17.

†"A Handlist of the Birds of Borneo", Journ. Straits Branch Royal Asiat. Soc. No. 67, 1914, p. 131.

Both sexes of this quail are variable. Males vary in the general tone of the upper parts, the amount of black on the mantle, and the extent of chestnut on the wings and lower parts: and the only character that could be used to separate birds of this sex from the Malay Peninsula, Sumatra and Borneo is the rather paler (browner and less bluish) upper parts of the continental birds. Specimens with or without rufous in the wings occur in all three localities.

Newly killed females are greyer and considerably less yellowish than skins that have been in collections for a few years.

Forms with dark females also occur in S. and W. Sumatra (?), Java, the Phinppines, Celebes and elsewhere: the Javan bird has been named *palmeri* by Riley,* and *caerulescens* has been applied to Bornean birds by Hachisuka,† but these seem not improbably identical and differences between them have not been stated. We have no material from Java.

The Philippine form, *lineata* occurs in Palawan.

5. **Lophura ignita** (Shaw and Nodder).

Lophura nobilis (Sclater).

3 ♂, 2 ♀ Samawang River and Bettotan.

Males.—(*a*) "Iris red; bare skin on head cobalt; bill pale greenish ivory; feet pale yellowish grey washed with pink."

(*b*) "Feet fleshy ivory blotched with red."

(*c*) "Feet ivory, tarsi tinged with green."

Females.—"Iris red; maxilla dark horn; mandible pale horn, feet fleshy washed with scarlet."

When the sexes are compared with some from the Baram district of Sarawak the northern males seem to have the crest rather scanty and the females appear to be rather less lively brown on the mantle but the differences are small.

No form of *Lophura* occurs in the Philippines.

6. **Argusianus argus grayi** (Elliot).

2 ♂, 2 ♀ Bettotan.

Male.—"Iris brown; bare skin on head dull blue; bill ivory white, brown or black at the base of the maxilla; feet carmine."

Female.—"Maxilla horny; mandible tip greyish, base fleshy; feet scarlet."

Males.—(*a*) T. L. 1510; W. 820; T. 1020; Ts. 100; B. f. g 45 mm. (*b*) T. L. 885; W. 605; T. 420; Ts. 102; B. f. g. 44 mm. (*a*) is a fully adult bird with lengthened rectrices; (*b*) is younger.

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*Proc. Biol. Soc. Wash., 32, 1919, p. 93.

†Bull. B. O. C., xlvii, 1926, p. 69.

Females.—(*a*) T. L. 750; W. 370; T. 330; Ts. 83; B. f. g. 40 mm. (*b*) T. L. 630; W. 285; T. 230; Ts. 80; B. f. g. 40 mm. (*b*) is younger than (*a*).

No form of *Argusianus* occurs in the Philippines.

TRERONIDAE

7. **Butreron capellei** (Temm.) subsp.

1 ♂, 3 ♀ Bettotan.

"Iris dark; edge of eyelid yellow; bill very pale green, cere and base olive; feet yellow."

Male.—T. L. 380; W. 195; T. 116; Ts. 29; B. f. g. 36 mm.

Females.—T. L. —, 366, 375; W. 197, 195, 190; T. —, 130, 132; Ts. 30, 36, 28; B. f. g. 37, 36, 36 mm.

We have been unable to compare these birds with topotypes of *capellei* from Java, but together with some from Sarawak they do not differ essentially from a series from the Malay Peninsula (*magnirostris* Strickl., A. M. N. H., 1844, p. 115) all the differences in colour being due to the age of the plumage at the time of death and the subsequent effect of grease on the skin.

Oberholser has named a bird from Klumpang Bay, S. E. Borneo, *B. c. messopora.**

No form of *Butreron* occurs in the Philippines.

8. **Treron curvirostra curvirostra** (Gm.).

4 ♂, 1 ♀ Samawang River and Bettotan.

"Iris yellow; lids chalky green; maxilla yellowish or greenish ivory; cere crimson; mandible greenish ivory, base at the sides crimson or olive; feet dark cerise or crimson."

Males.—T. L. 248, 263, 262, 250; W. 129, 131, 130, 130; T. 81, —, 80, 85; Ts. 22.5, —, 19, 21; B. f. g. 23, —, 22, 23 mm.

Female.—T. L. 233; W. 127; T. 78; Ts. 21; B.f.g. 23 mm.

These birds are perhaps a trifle paler on the forehead than most examples from the southern part of the Malay Peninsula (type locality) and none is so grey below as *some* topotypes but a number of the latter and Bornean birds are exactly alike.

There is evidently some variation in the colour of the bill in both sexes of *curvirostra*: the base of the mandible is not always red but may be entirely olive. Birds from Bandjermasin have been named *nasica* by Schlegel.

9. **Treron curvirostra erimacra** Oberh.

Treron nasica Grant, Ann. Mag. Nat. Hist. (6) 2, 1888, p. 352 (Banguey Id.).

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*Journ. Wash. Acad. Sci., 14, 1924, p. 209.

Treron curvirostra erimacra Oberholser, Journ. Wash. Acad. Sci, 14, 1924, p. 297 (Balabac Island, Philippine Ids.).

1 ♂ Balambangan Island.

"Iris yellow; eyelid chalky green; bill greenish ivory, base of mandible olive, cere crimson; feet dark cerise."

T. L. 265; W. 141; T. 88; Ts. 22; B.f.g. 24 mm.

This bird is larger than any *curvirostra* we have seen from Malaysia: it is also rather paler below than Bornean mainland birds and the breast is perhaps more tinged with yellow: if not *erimacra*, of which we have no topotypes, it is at least *T. c. curvirostra* > *erimacra*.

A male and female of this species were collected on Banguey by Everett. Their wings measure 138 and 128 respectively and Mr. H. C. Robinson, who has examined them, states that the orange wash on the breast of the male is not so well marked as in some Palawan birds.

T. c. erimacra is also found in Palawan.

10. **Treron fulvicollis baramensis** Meyer.

3 ♂ Kudat and Benoni; 4 ♂, 3 ♀ Banguey Island; 2 ♂, 1 ♀ Balambangan Island.

"Iris pink; edge of eyelids orange; bill pale grey, cere and base dark crimson; feet cerise."

Males.—T. L. 278, —, —, 265, 273, 280, 278, 290, 287; W. 152, 145, 148, 150, 148, 152, 150, 154, 154; T. 98, —, —, 92, 88, 98, 96, 95, 97; Ts. 21, —, —, 22, 21, 23, 22, 22, 23; B. f. g 21, —, —, 19, 20, 21, 21, 24, 21 mm.

Females.—T. L. 255, 268, 280, 275; W. 142, 148, 147, 147; T. —, 92, 94, 90; Ts. 20, 22, 19, 23; B. f. g 20, 20, 21, 21 mm.

(The skins are measured in the order in which they are listed above.)

The variation in these specimens is rather more than is usual in birds of this genus from any one locality. The males vary in the depth of the chestnut and grey on the undersurface and also in the amount of green wash on the abdomen and the females also in the latter character; but all are undoubtedly *baramensis* which is a well-marked race, although our series of females is not large enough to enable a comparison of *fulvicollis* and *baramensis* in this sex.

The type of *baramensis* came from the Baram district in North Sarawak and in addition to the localities listed above we also know that it occurs at Labuan, Brunei, Mt. Kalulong and Mt. Mulu (both in North Sarawak). Typical *fulvicollis* also occurs in Borneo being found in the south of the island and also in the west of

Sarawak (specimens from near Mt. Poi and from Samarahan). The birds of Borneo (other than as above), Java, Sumatra, the Malay Peninsula, Billiton, Rhio, etc., are apparently inseparable but those from the Natuna Islands run rather large.

No form of *T. fulvicollis* occurs in the Philippines.

11. **Treron vernans griseicapilla** Schleg.

Treron griseicapilla Schlegel, Nederl. Tijd. Dierk., 1, 1863, p. 70 (Sumatra and Bangka).

1 ♂ Kudat; 3 ♂, 1 ♀ Banguey Island; 1 ♂, 2 ♀ Balambangan Island.

"Iris outer ring pink, inner ring blue; bill grey, cere and base olive and yellowish green; feet cerise" (*male*).

"Iris pinkish yellow" (*female*).

Males.—T. L. 267, 260, 270, 277, 282; W. 142, 146 —, 144, 147· T. 87, 94, 97, 97, 97; Ts. 21, 20, 17, 21, 22; B. f. g. 22, 21, 19, 20, 22 mm.

Females.—T. L. 265, 270, 255; W. 144, 140, 141; T. 93, 80, 83; Ts. 23, 23, 21; B. f. g. —, 21.5, 19 mm.

(*The skins are measured in the order in which they are listed above*).

T. griseicapilla was based on one Sumatran and numerous Banka Island birds and the name is available for the race inhabiting the Malay Peninsula (syn. *abbotti* Oberh) and, at least, Western and Northern Borneo. Hartert and Goodson* put Bornean birds in the dark-crowned section of *vernans*, i.e., *griseicapilla* and for the material before us from Sarawak and North Borneo the allocation seems correct. Riley† places them with the pale-crowned *purpurea*: his material probably came from the southern half of the island. A skin before us from Sampit, South coast of Borneo, is nearest to *purpurea* of Java and it is quite probable that this is the name for birds from South and East Borneo. The differences are slight but generally appreciable.

T. vernans occurs in Palawan and Sibutu (Coll. Everett). Birds from the last are probably *griseicapilla* or *nesophasma* Oberh. Palawan birds are almost certainly typical *vernans*

12. **Treron olax** (Temm.).

Dendrophassa olax arismicra Oberh. Journ. Wash. Acad. Sci., 14, 1924, p. 298: N. E. Borneo.

9 ♂, 3 ♀ Bettotan.

"Iris, inner ring white, outer ring pink; edge of eyelid yellow; bill greenish ivory, cere and base bluish green; feet cerise" (*male*).

"Iris, inner ring white, outer ring buff" (*female*).

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*Nov. Zool., 1918, p. 355.

†Proc U. S. Nat. Mus., 64, 1924, p. 11

Males.—T. L. 228, 230, 235, 228, 230, 230, 220, 218, 232; W. 117, 118, 123, 123, 124, 123, 122, 122, 127; T. 80, 77, 75, 81, 84, 80, 78, 75, 78; B. f. g. 18, 18, 19, 18, 19, 18, 17, 18, 19 mm.

Females.—T. L. 227, 226, 222; W. 127, 121, 118; T. 84, 81, 73: Ts. 20, 20, 19; B. f. g. 18, 19, 19 mm.

We find it quite impossible to divide this species into races, but have not seen birds from Java. There seems to be no appreciable difference in size or colour between specimens from North Borneo, the Malay Peninsula and Sumatra (the type locality of *olax*).

T. olax is not known from the Philippines.

13. **Ptilinopus jambu** (Gm.).

6 ♂, 1 ♀ Bettotan.

"Iris red; eyelid pale grey; bill deep yellow; feet crimson" (*male*).

Males.—T. L. 270, 252, 262, 257, 275, 265; W. 142, 144, 140, 135, 146, 144; T. 100, 97, 90, 88, 102, 93; Ts. 18, 20, 21, 19, 17, 17; B. f. g. 24, 23, 22, 25, 24, 23 mm.

Female.—T. L. 248; W. 133; T. 95; Ts. 16; B. f g 22 mm.

P. jambu is not known from the Philippines.

14. **Ptilinopus melanospilas bangueyensis** Meyer.

Ptilopus bangueyensis Meyer, J. f. O., 1881, p. 70 (Banguey Island).

1 ♂ Banguey Island; 1 ♂, 1 ♀ Balambangan Island.

"Iris yellow or olive; eyelids yellow or yellowish green; bill yellowish green; feet cerise" (*male*).

"Iris yellow; eyelids chalky green; maxilla black, cere, etc., black and pale green; mandible pale green, tip black; feet cerise" (*female*).

Males.—T. L. 252, 250; W. 124, 127; T. 85, 90; Ts. 19, 19; B. f. g. 22, 24 mm.

Female.—T. L. 233; W. 120; T. 85; Ts. 21; B. f. g. 20 mm.

The only difference we can see between these males and a series from Java is that the latter are smaller (wings 110 - 119 mm.) and perhaps rather less brightly green on the underparts. Hartert has noticed *bangueyensis* in Nov. Zool. x, 1903, p. 33.

P. m. bangueyensis has been recorded from Palawan, Cagayan Sulu and Sibutu, but the Cagayan Sulu race has recently been described by Oberholser as *enantia*.

15. Ducula ænea ænea (Linn.).

1 ♀ Bettotan.

"Iris dark; edge of the eyelid dull crimson; maxilla grey, cere tinged crimson, mandible grey; feet livid crimson."

T. L. 432; W. 240; T. 160; Ts. 33; B. f. g. 35 mm.

Typical *aenea* also occurs in Sibutu (coll. Everett).

16. Ducula ænea palawanensis (Blas.).

Carpophaga ænea palawanensis Blas., Ornis, iv, 1888, p. 316 (Palawan).

1 ♂ Banguey Island.

"Iris and eyelid dull crimson; bill grey, slaty at base; feet livid crimson."

T. L. 460; W. 259; T. 175; Ts. 30; B. f. g. 40 mm.

In Cat. Birds, xxi, p. 195, Savadori placed a bird from Banguey (Coll. Everett) under *palawanensis* and the skin before us certainly seems to agree with the description of that form.

It has the hind neck rather paler and more sharply defined against the bronze-green back than the bird from Bettotan and many others from various parts of Malaysia: it is also larger than *ænea*.

Typical *ænea* with a bluish tail is found on the mainland of North Borneo and in the Sulu Archipelago: *palawanensis*, also with the tail blue, but with the neck sharply defined, occurs in Banguey and (fide McGregor) Balabac and the Calamianes, but north and east of this is found *chalybura* which is like *palawensis* but with the tail greener.

D. a. palawanensis extends north through Palawan to the Calamianes Islands.

PERISTERIDAE

17. Streptopelia chinensis tigrina (Temm. in Knip).

2 ♂, 1 ♀ Kudat; 1 ♂ Banguey Island.

"Iris yellow or pinkish yellow; bill black; feet dull crimson."

Males.—T. L. 308, 305, 315; W. 140, 144, 145; T. 142, 136, 145; Ts. 23, 24, 24; B. f. g. 21.5, 22.5, 22 mm.

(The measurements of the Banguey bird are given last).

Female.—T. L. 286; W. 136; T. 134; Ts. 23; B. f. g. 21 mm.

Not separable from topotypes.

S. c. tigrina also occurs in Palawan.

18. Chalcophaps indica indica (Linn.).

3 ♂ Samawang River, Bettotan and Rayoh; 2 ♂, 3 ♀ Banguey Island.

"Iris dark; bill orange-red; cere crimson; feet crimson.

Males.—(Mainland). T. L. 235, 243, 250; W. 140, 144, 140, T. 87, 100, 87; Ts. —, 24, 26; B. f. g. 21, 20, 20 mm.

Males.—(Banguey). T. L. 257, 246; W. 148, 138; T. 92, 84; Ts. 28, 26; B. f. g. 22, 21 mm.

Females.—(Banguey). T. L. 240, 258, 238; W. 141, 148, 137, T. 90, 98, 90; Ts. 25, 25, 20; B. f. g. 21, 20, 21 mm.

C. i indica also occurs in Palawan and Sibutu (coll. Everett).

RALLIDAE

19. **Hypotaenidia striata striata** (Linn.).

1 ♀ Benoni.

Wing, 113 mm.

Two fresh skins from Java are not separable from a series from the Malay Peninsula: all are paler below than birds from Sarawak and North Borneo. We therefore employ *striata* for Borneo and *gularis* for Java, the Malay Peninsula* and Sumatra Birds from Sumatra are, fide H. C. Robinson, quite definitely the same as those from the Malay Peninsula. we agree with this opinion.

Typical *striata* occurs in the Philippines.

20. **Amaurornis phœnicura javanica** (Horsf.).

2 ♂, 2 ♀ Bettotan.

"Iris brown; bill apple-green, culmen olive; cere dull red; feet greenish ochre or brownish olive."

Males.—T. L. 308, 302; W. 152, 148; T. 58, 62, Ts. 55, 52 B. f. g. 39, 35·5 mm.

Females.—T. L. 262, 290; W. 138, 138; T. 56, 53; Ts. 53, 49; B. f. g. 36, 36 mm.

A. p javanica also occurs in Palawan.

CHARADRIIDAE

21. **Charadrius apricarius fulvus** (Gm.).

1 ♂ Balambangan Island.

"Iris dark; bill black; feet grey."

T. L. 242; W. 155; T. 64; Ts. 44; B. f. g. 29 mm

22. **Charadrius leschenaulti** Less.

1 ex. Kudat; 2 ♂ Balambangan Island

(*a*) "Iris dark; bill black; feet leaden, tarsi pale brownish grey."

(*b*) "Feet leaden greenish brown; tarsi pale greenish brown."

Males.—T. L. 218, —; W. 140, 139; T. 55, 57; Ts. 35, 37; B. f. g. 28, 30 mm.

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*Some birds from the Malay Peninsula may be *jouyi* Stejneger.

23. **Charadrius mongolus mongolus** Pall.

1 ♂ Banguey Island; 1 ♀ Balambangan Island.

Male.—"Iris dark; bill black; feet grey-green; tarsi stone-green."

Female.—"Feet blackish grey."

Male.—T. L. 210; W. 140; T. 55; Ts. 35; B. f. g. 26 mm.

Female.—T. L. 197; W. 136; T. 53; Ts. 32; B. f. g. 20 mm.

24. **Charadrius mongolus atrifrons** Wagl.

1 ex., 1 ♀ Kudat.

"Feet slaty green."

T. L. 185, 196; W. 130, —; T. 50, 52; Ts. 36, 37; B. f. g. 20 mm.

25. **Charadrius alexandrinus peroni** Bp.

2 ♂, 3 ♀ Kudat; 2 ♂, 2 ♀ Balambangan Island.

Males.—"Iris brown; bill black; pale at base of mandible; feet greyish flesh."

Females.—"Feet yellowish grey."

Males.—T. L. 158, 155, 162, 169; W. 99, 99, 97, 102; T. 42, 40, 39, 46; Ts. 30, 29, 29, 29; B. f. g. 18, 19, 18.5, 19 mm.

Females.—T. L. 164, 163, 160, 162, 167; W. 102, 101, 100, 100, 100; T. 42, 41, 40, 43, 42; Ts. 28, 29, 29, 26, 27; B. f. g. 19, 18, 18, 18; 17.5 mm.

(The measurements of the Balambangan birds are given last).

Although these sand-plovers were shot surrounded by flocks of migratory waders we think that they were resident birds: unlike the other waders all the *peroni* were in pairs and without fat.

It has been suggested* that birds from Borneo and the Malay Peninsula belong to different races but after examining fair series from both places we consider them the same. We have no topotypes of *peroni*.

C. a. peroni also occurs in Palawan and Sibutu.

26. **Numenius phæopus variegatus** (Scop.).

2 ♀ Balambangan Island.

"Iris dark; maxilla black; mandible fleshy, tip blackish; feet stone-grey."

T. L. 433, 450; W. 243, 237; T. 100, 102; Ts. 56, 57.5; B. f. g. 87, 87 mm.

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*Robinson, Journ. F. M. S. Mus., vii, 1917, p. 139.

27. Tringa hypoleucos Linn.

1 ♂ Kudat; 1 ♀ Balambangan Island.

"Iris brown; bill slaty; feet pale greenish grey."

Male.—T. L. 195; W. 111; T. 57; Ts. 25; B. f. g. 28 mm.

Female.—T. L. 188; W. 106; T. 58; Ts. 24; B. f. g. 28.5 mm.

ARDEIDAE

28. Ardea sumatrana sumatrana Raffles.

1 ♀ Banguey Island.

"Iris yellow; orbital skin olive; maxilla black; mandible black, beneath the tip yellow, the middle white and the base yellow and olive; feet blackish, brown on back of tarsi, yellowish on back of tibia."

T. L. 1225; W. 465; T. 190; Ts. 150; B. f. g. 195 mm.

A. s. sumatrana also occurs in Palawan.

29. Demiegretta sacra sacra (Gm.).

1 ♂ Banguey Island; 1 ♀ Balambangan Island.

♂. "Iris yellow; maxilla dull brown, greenish brown at the base; mandible dull yellowish, washed with greenish at the base; feet greenish yellow, tarsi blackish in front."

♀. "Bill blackish and blackish grey."

Male.—T. L. 615; W. 285; T. 100; Ts. 75; B. f. g. 104 mm.

Female.—T. L. 600; W. 280; T. 105; Ts. 74; B. f. g. 100 mm.

Both in the dark phase. Our local series of this heron is very variable in size and colour.

D. s. sacra also occurs in Palawan.

FREGATIDAE

30. Fregata ariel ariel (Gould.).

F. a. ariel Chas. and Kloss, Journ. Malayan Branch, Royal Asiatic Soc., II, 1924, p. 64.

1 ♀ Balambangan Island.

"Iris dark; eyelids dull crimson; bill dull pink, tip black; feet fleshy to bright pink."

T. L. 770; W. 580; T. 315; B. f. g. 101 mm.

F. a. ariel also occurs in Palawan.

FALCONIDAE

31. Cuncuma leucogaster leucogaster (Gm.).

1 ♂ Balambangan Island.

"Iris dark; bill horny black; feet buffy white."

T. L. 668; W. 530; T. 240; Ts. 89; B. f. g. 55 mm.

C. l. leucogaster also occurs in Palawan.

32. **Microhierax latifrons** Sharpe.

3 ♂, 1 ♀ Bettotan.

"Iris brown; bill and feet black."

Males.—T. L. 158, 160, 152; W. 94, 95, 97; T. 60, 66, 57; Ts. 20, 20, 20; B. f. g. 13, —, 12 mm.

Female.—T. L. 165; W. 103; T. 65; Ts. 20; B. f. g. 12 mm.

One of the males has the forehead and cheeks pure white; the others have these parts rich buff. One of the latter is a young bird but the third, which is exactly like the female, seems fully adult: it was sexed by one of us in the field as a male.

M. fringillarius occurs at various localities in west, central and east Borneo: it seems to be common in Sarawak where it is found at least as far north as Baram.

M. latifrons is known from North Borneo only: on the west coast it occurs as far south as Lawas while on the east Guillemard's specimen from Silam in Darvel Bay still seems to be the most southerly record.

No form of *Microhierax* is known from Palawan or the Sulu Archipelago.

BUBONIDAE

33. **Strix leptogrammica leptogrammica** Temm.

1 ♀ Rayoh.

"Iris dark brown; bill and feet grey."

T. L. 395; W. 313; T. 164; Ts. 57; B. f. g. 37 mm.

No form of this species is known from the Philippines.

TYTONIDAE

34. **Phodilus badius badius** (Horsf.).

1 ♂ Bettotan.

"Iris dark; bill pale fleshy; feet yellowish."

T. L. 265; W. 193; T. 90; Ts. 37; B. f. g. 34 mm.

Phodilus has recently been recorded for the first time from the Philippines (*Samar*).

PSITTACIDAE

35. **Psittacula longicauda longicauda** (Bodd.).

1 ♂ Benoni.

W. 151 mm.

Not known from the Philippines.

36. Coryllis galgulus galgulus (Linn.).

8 ♂, 1 ♀ Rayoh; 4 ♂ Banguey Island.

"Iris dark; bill black; feet brown or olive brown, tarsi tinged with olive."

Males.—T. L. 125, 132, 118, 128, 130, 127, 132, 127, 131, 128, 138; W. 82, 80, 80, 85, 80, 79, 83, 82, 85, 81, 85; T. 33, 33, 33, 33, 37, 32, 34, 33, 35, 32, 35; B. f. g. 11, 11, 11, 12, 11, 13, 13, 10, 11, 11, 13 mm.

(The measurements of three Banguey birds (one is immature) are given last).

Female.—T. L. 126; W. 82; T. 32; Ts. 25; B. f. g. 11 mm.

The colours of the soft parts noted above were taken from Banguey birds: those from the mainland were labelled by a native collector as having the feet "orange", but this is perhaps an exaggeration although we have birds from the Malay Peninsula in which the feet are noted as "olive-yellow" or "dull ochreous".

Not separable from topotypes of *galgulus.*

L. galgulus has been recorded from Cagayan Sulu but the record is unsatisfactory: otherwise the species is not known from the Philippines.

PODARGIDAE

37. Batrachostomus stellatus (Gould).

1 ♂, 1 ♀ Bettotan.

♂. "Iris dark; maxilla pale horny; mandible pale brownish green; feet yellowish fleshy."

♀. "Iris pale buff spotted with black externally; maxilla brown; mandible pale greenish brown; feet fleshy."

Male.—T. L. 240; W. 125; T. 125; Ts. 14; B. f. g. 36 mm.

Female.— T. L. 242; W. 125; T. 117; Ts. 13; B. f. g. 36 mm.

The male is much more rufous above and paler below than the female: it can be practically matched by a specimen from the Malay Peninsula, but the female is brighter than any of our few continental birds. In our small series of this species the more richly coloured birds (more chestnut) all come from Borneo but dark specimens also occur in that island.

B. stellatus, as such, has not been recorded from the Philippines and we need to know far more of this difficult genus before attempting to link up the various forms described.

38. Batrachostomus javensis Horsf.

1 ♀ Kudat.

"Iris yellow; maxilla brown; mandible drabby; feet fleshy."

T. L. 265; W. 141; T. 138; Ts. 15; B. f. g. 38 mm.

We have five skins of this species before us. One unsexed (? female) bird from the Lampongs, Sumatra, is in the rufous phase (near "cinnamon-rufous"): the Kudat female is in the brown phase. The remaining three birds, one from Sumatra and two from Sarawak, are in the blackish or grey phase although one Sarawak bird is rather browner than the other two. One Sarawak bird has been sexed by the collector as a male but perhaps in error. The other two are marked as females.

B. javensis occurs in Palawan.

39. **Batrachostomus affinis** Blyth.

1 ♂ Banguey Island.

"Iris yellow becoming grey; maxilla brownish; mandible pale greenish horny; feet fleshy brown."

T. L. 235; W. 123; T. 113; Ts. 14; B. f. g. 33 mm.

This specimen appears to be in an immature phase. The general tone of the plumage is grey and brown and the top of the head is spotted with pale buff.

B. affinis occurs in Palawan.

CORACIIDAE

40. **Eurystomus orientalis orientalis** (Linn.).

1 ♂, 2 ♀ Bettotan and Benoni; 1 ♂ Banguey Island.

(*a*) "Iris dark; maxilla blackish, edges at the gape red; mandible red; feet red washed with brown."

(*b*) "Bill red, culmen broadly blackish; tip blackish."

Males.—T. L. —, 295; W. 197, 195; T. —, 118; Ts. —, 19; B. f. g. —, 37 mm.

Females.—T. L. 286, 300; W. 188, 197; T. 100, 108; Ts. 20, 20; B. f. g. 39, 40 mm.

We also have typical *orientalis* from Sarawak (Nov.—Jan.).

E. o. orientalis occurs in Palawan and Sibutu.

41. **Eurystomus orientalis calonyx** Sharpe.

1 ♂ Balambangan Island.

"Iris dark; maxilla red washed with brown; mandible red; feet brownish red."

T. L. 294; W. 188; T. 108; Ts. 18.5; B. f. g. 41 mm.

None of these *Eurystomus* skins is so typically representative of its form as others we have seen from various parts of Malaysia. The bird we have here listed as *calonyx* is not so bright as many we have, but it seems nearer to that form than to *orientalis*.

A specimen taken at Baram, Sarawak in 1891 also seems undoubtedly *calonyx* but Stresemann puts all the more brightly coloured Malaysian birds under "*orientalis* >< *calonyx*."

E. o. calonyx has not been recorded from the Philippines.

ALCEDINIDAE

42. Ramphalcyon capensis javana (Bodd.).

2 ♂ Benoni; Gomantong.

W. 144, 147 mm.

The Gomantong bird has the crown of the head much darker than the Benoni example and some from Sarawak.

The Philippine Stork-billed kingfishers are all forms of *capensis* *gouldi* is found in Palawan and *gigantea* in Sibutu *R. c. javana* has been recorded from Palawan but no doubt in error.

43. Alcedo atthis bengalensis (Gm.).

1 ♀ Kudat.

"Iris dark; maxilla dark brown; mandible dull red, edges and base dusky; feet red, tarsi brownish."

T. L. 168; W. 74; T. 35; Ts. 10; B. f. g. 46 mm.

A. a. bengalensis occurs in Palawan.

44. Alcedo meninting verreauxi de la Berge.

Alcedo verreauxii de la Berge, Rev. Zool. (2), iii, 1851, p. 305, pl. 9: Borneo.

Alcedo meninting meninting St. Baker, Bull. B. O. C., xxxix, 1918, p. 37.

2 ♂ ad. Bettotan.

(*a*) "Iris dark; bill black; feet red."

(*b*) "Maxilla red, washed with brown; mandible red."

T. L. 148, 154; W. 63, 65; T. 25, 26; Ts. 9, 10; B. f. g. 48, 45.

Typical *meninting* of Java is paler or more turquoise than specimens from the Malay Peninsula, Sumatra and Borneo: it is also rather larger, the wings ranging 64–70 mm. in length while none that we have seen from the latter localities exceeds 65 mm.

The Bettotan birds both have the rusty ear-coverts of the type of *verreauxi*, but in an adult male from South Sarawak these are blue. In one male of a considerable series from the Malay Peninsula the ear-coverts are red and in one other male mingled blue and red, in a nestling from the same area they are pure blue.

Hartert records one red and two blue-cheeked birds from Lombok[*] and Buttikofer found a considerable proportion of red, and red and blue-cheeked birds, in a series obtained from Sumatra to Celebes[†]. Sharpe (in his Monograph of the Alcedinidae) considered red-cheeked birds to be females while Meyer and Wiglesworth say that they are young, as does Laubmann.

We regard the rusty cheeks an an aberration merely, but must maintain other Malaysian birds, (apart from those of some West Sumatran islands) as distinct from the typical *meninting* of Java (and Lombok and ? Bali) on account of their smaller size and slightly darker blue of the upper surface.

A form of *A. meninting* occurs in Palawan (*vide* Baker, Bull B. O. C., XXXIX, 1918, p. 38).

45. **Ceyx erithacus motleyi** Chas. and Kloss.

Ceyx erithacus motleyi Chasen and Kloss, Journ. für Ornith., 1929, Band 2, p. 106.

1 ♂ Bettotan, 1 ♂ Banguey Id.

"Iris dark, bill and feet scarlet."

T. L. 140, 144; W. 60, 59; T. 26, 25; Ts. 9.5, 9.5; B. f. g. 41, 45 mm.

These birds are both fine adults.

Like *C. e. erithacus* (Linn., syn. *tridactylus* Pall. and auct.) but with the mantle lilac-rufous instead of black and blue.

Type Adult male from Bettotan near Sandakan, British North Borneo, 1st August, 1927.

Specimens examined. The type; 1 ♂ ad., Banguey Id.; 1 ex. ad., British North Borneo; 2 ♂ ad., 2 ♀ ad., Telen River, middle East Borneo[‡], 2 ex. ad., Baram River, North Sarawak; 1 ♀ imm Mt. Dulit, North Sarawak[§], 1 ♂ ad., 2 ♀ subad.[¶], Belaga, Upper Rejang River, Sarawak[§].

This is the *Ceyx dillwynni* Sharpe, in the Catalogue of Birds (XVII, 1892, p. 177) but not the *C. dillwynni* sp. n. Sharpe, in P Z S., 1868, pp. 591, 593; id., ib., 1869, pp 507 511: and Monogr. Alced. 1870, p. 125, pl. 43, which in our opinion is based on an immature example of *C. rufidorsus* Strickl.; so that *dillwynni* is the name for Bornean birds of that species if they are different from *C. rufidorsus*.

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[*] Nov. Zool. III, 1896, p. 550.

[†] Notes Leyden Mus., XXVI, 1905, p. 46.

[‡] The Telen River is a tributary entering the Koetai, or Mahakkam River from the north and the specimens listed above (for the loan of which we are indebted to the Zoological Museum, Buitenzorg, Java) came from Lat. 1° and 1° 50 North.

[§] In the collection of the Sarawak Museum.

[¶] With black scapulars and wings and the underparts rufous and white.

Sharpe's description in the *Catalogue of Birds* is an excellent one of the birds now before us except that it omits to state that the outer edge of the first primary is partly or largely rufous (as in the typical *erithacus*; and in the birds from Nias Island that Salvadori treats as *C. dillwynni**: but it is not the *C. dillwynni* Sharpe, which lacks the blue patch on the side of the neck.

Our birds are the same as the male from Marup, North Borneo, recorded doubtfully as *C. sharpei* Salvad., by Walden (Ibis, 1872, p. 368) who says of it: "It has the wings of *C. tridactyla* and it also possesses the large deep-blue spot on the head of that species. It is certainly not *C. dillwynni* Sharpe, with the type of which I have compared it." They are also the *C. dillwynni* of Borneo as described by Hartert (Nov. Zool., IX, 1902, p. 431) and Laubmann (Arch. f. Naturgesch., 1924, Abt. A, 7, p. 104).

We have before us a hundred and ten specimens of *Ceyces* from various parts of Malaysia and can only recognise in this sub-region two species, *erithacus* and *rufidorsus*: these occur side by side in the Malay Peninsula, Sumatra and Borneo, but not in Palawan, or Java with Bali, which are inhabited by one species, *rufidorsus*, only.

The first species, *C. erithacus*, can be recognised in any stage of plumage by the blue neck-patches and the wing-coverts entirely bluish black except at the "elbow": the second, *C. rufidorsus*, has no blue neck-patches and the wing-coverts are always largely, or entirely, rufous.

We are not prepared to dogmatise with regard to all immature birds, but young examples of *erithacus*, however, seem like the adults but with rather less blue above; they seem to have no rufous in the wing-coverts except at the elbow and the underparts are rufous instead of yellow: the tail is generally black-tipped.

Young examples of *rufidorsus* seem to show some approach to *erithacus* in that they not infrequently have a little blue in the upper parts†: they sometimes have a dark frontal spot, but the wing-coverts are always partly rufous: they often have black, or black-tipped, tails.

The dark frontal spot is practically always absent in adult *rufidorsus* (once present in forty-four examples) and practically always present in adult *erithacus* (once absent in thirty-six specimens).

We can see no difference in the colour of *rufidorsus* throughout its entire range in Malaysia (but Palawan specimens not seen by us); its wing-length varies from 55 to 63 mm., but the last figure is exceptional; and though the largest wings do not occur in *Java* yet the range is too small to include two dimensional races. We do not, therefore, recognise *C. innominatus* Salvad. (*vide* also Hartert, l. c. s.).

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*Ann. Mus. Civ. Gen., 1886, p. 537.

†*Vide* also McGregor, Manual of Philippine Birds, 1909, p. 314. Discussion of plumages of *C. rufidorsus* showing that immature birds not infrequently have a little blue on the back and wings.

The other species, *crithacus*, is separable into two races:—The typical form; and that now described which occurs in Nias as well as in Borneo—for Salvadori's descriptions of birds from the West Sumatran island (l. c. s.) apply exactly to our Bornean series. *Ceyx enopopygius* Oberholser, based on an immature female from North-eastern Sumatra* is diagnosed as having the lower back and rump brilliant cobalt blue instead of magenta (the other characters given are merely those of immaturity). In our collection is an immature female from the Aroa Islands in the Straits of Malaccá (which are rather nearer to Sumatra than to the Malay Peninsula) which has a considerable amount of bright cobalt on the lower back, though the rump is magenta. We regard these specimens as merely representing an uncommon stage, or phase of immature plumage (perhaps a relic of an ancestral blue). Specimens we have examined from the north, middle and south of Sumatra are inseparable from Malayan birds.

We think the reported occurrences of *crithacus* in Palawan and Java (*"dillwynni"*, Laubmann, l. c. s.) are very questionable: and that before any other species than *rufidorsus* can be accepted for these islands, fully-adult examples, and not dubious young specimens, must be produced. Laubmann's *"dillwynni"* of Java and Malacca are obviously young *rufidorsus* and McGregor (l. c. s.) who has discussed the *Ceyx* of the Palawan area at some length regards all as *euerythra* (= *rufidorsus*) as indeed they seem to be.

Distribution of Ceyces in the Malaysian rubregion:

I. *C. crithacus* (Linn.), Bengal. Syn. *tridactyla* Pall. and auct.; *enopopygius* Oberholser, Sumatra.

(*a*) *C. c. crithacus* (Linn.). The Malay Peninsula; Aroa Ids., Straits of Malacca; Sumatra.

(*b*) *C. c. motleyi* Chas. and Kl. Borneo; Banguey Id., Labuan (?); Nias Id. off West Sumatra.

II. *C. rufidorsus* Strickl., Malacca. Syn. *dillwynni* Sharpe, Labuan Id.; *innominata* Salvad., Java; *sharpei* Salvad., Sarawak; *euerythra* Sharpe, Malay Peninsula; *robusta* Parrot, N. E. Sumatra.

C. r. rufidorsus Strickl. Malay Peninsula, Rhio-Lingga Ids.; Banka Id.; Billiton Id.; Sumatra; Mentawi Ids.; Batu Ids.; Java; Bali; Kangean Ids.; Anamba Ids.; Natuna

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*Smithsonian Misc Collns., 60, 1912, p. 7.

Ids.; Borneo; Labuan Id.; Balabac Id.; Palawan; Calamianes Ids. (perhaps a local form in three last localities).

46. **Halcyon coromanda minor** (Temm. and Schl.).

Entomothera coromanda minor Oberh., Proc. U. S. Nat. Mus., 48, 1915, p. 649.

Halcyon coromanda minor Kloss, Journ. Fed. Malay States Mus., x, 1921, p. 216.

1 ♀ Kenoni.

Wing, 106 mm.

No form of the species has yet been recorded from Sibutu. The Palawan form is placed by Oberholser under his *ochrothorectis* described from Masbate. He records this race, and also *minor*, from Tawi-Tawi.

47. **Halcyon chloris cyanescens** (Oberh.).

Sauropatis chloris armstrongi Kuroda, Tori, iv, 1925, p. 8.

2 ♂, 1 ♀ Kudat and Jesselton; 1 ♀ Banguey Island.

"Iris dark; maxilla black; mandible white, edges and tip black or blackish.

Males—T. L. 250, —; W. 107, 107; T. 70, —; Ts 16, —, B. f. g. 60, — mm.

Females.—T. L. 244, 267; W. 109, 106; T. 72, 75; Ts. 17, 16, B. f. g. 59, 59 mm.

Oberholser considers that the bird occurring in Sibutu and Palawan is *H. c. collaris* (Scop.): it occupies the whole of the Philippines

48. **Halcyon concreta borneana** subsp. nov.

Larger than *H. c. concreta* Temm., of Sumatra.

6 ♂ Bettotan.

"Iris dark; maxilla black, edges and tip yellow; mandible and feet yellow."

Males.—T. L. 241, 241, 238, 240, 238, 238; W. 117, 115, 111, 112; T. 70, 64, 60, 67, 55, 69; Ts. 17, 17, 18, 17, 16, 13; B. f. g. 59, 58, 57, 60, 54, 59 mm.

Sumatran topotypes and birds from the Malay Peninsula have the wings of males 102 - 111 mm.; Bornean males have wings 111 - 117 (once 108 mm.). Females (apparently less common in collections) seem rather larger:—Malayo-Sumatran maximum 114 mm., Bornean 122 mm. There appear to be no constant colour differences though Bornean males are darker than some continental individuals.

Type. Adult male collected at Bettotan near Sandakan, North Borneo by C. Boden Kloss and F. N. Chasen on 4th August, 1927. Wing, 117 mm.

No form of the species occurs in the Philippines but *lindsayi* (Vigors.) may be its representative although not found in Palawan or the Sulu Archipelago.

BUCEROTIDAE

49. **Buceros rhinoceros borneoensis** Schl. and Mull.

Buceros rhinoceros var. *Borneoensis* Schlegel and Muller, Verh. Nat. Ges. Ned. Ind., Zool., 1839-44, Aves, p. 22 (Borneo. Type locality here restricted to the Doeson or Barito River, S. E. Borneo, t. c. s. p. 27).

Buceros rhinoceroides Bp., Consp. Av., 1, 1850, p. 89 (Borneo).

2 ♀ Bettotan.

(*a*) "Right iris white, left iris yellow; bill ivory, yellow, red and black; feet olive brown."

(*b*) "Irides red; edge of the eyelids black; bill white, yellow, red and black; feet olive yellow"

T. L. 1,060, 1,000; W. 450, 420; T. 400, 370; Ts. --, 60; B. f. g. 205, 210; Length of horn 125, 117 mm.

This race was described as being small with the horn (sex unspecified) 110 to 120 mm. and wings 430 mm. long.

The casques of our material measure:—

Malay Peninsula ♂ 154, 161, 164, 168 200, 214; ♀ 132 (? mm), 140, 145 mm.

Sarawak, Baram District ♂ 145, 148, 148, 149; ♀ 136, 143 mm.

North Borneo ♂ 130; ♀ 117, 125 mm.

The separation of the Bornean bird (especially on the male) appears to be justified.

Buceros does not extend to the Philippines.

MEROPIDAE

50. **Merops viridis viridis** Linn.

2 ♂ Samawang River and Benoni.

"Bill black; feet dark brown."

T. L. 230, —; W. 112, 117; T. 85 —, mm.

M. viridis does not occur in the Philippines.

51. **Nyctiornis amicta** (Temm.).

2 ♂, 1 ♀ Bettotan, Kudat and Benoni.

♂. "Iris deep yellow; maxilla black; mandible black, base grey; feet dull olive-green."

♀. "Iris dark."

Male.—T. L. 355, —; W. 117, 126; T. 111, —; Ts. 14.5, —; B. f. g. 57, — mm.

Female.—T. L. 325; W. 125; T. 120; Ts. 15; B. f. g. 65 mm.

There is no reason for *Nyctiornis* Swains. 1836 to be superseded on account of *Nyctornis* Nitzsch 1829. In any case the next available name is *Alcemerops* (Isid. Geoffr. St. Hilaire, in Nouv. Ann. Mus. d'Hist. Nat. i, 1832, p. 395; genotype *Merops amicta*) and not *Bucia* Hodgson (Journ. As. Soc. Bengal, v, 1836, p. 360: genotype *N. athertoni*) used in the new edition of the Birds of British India.

Nyctiornis is not found in the Philippines.

CAPRIMULGIDAE

52. **Caprimulgus macrurus macrurus** Horsf.

Caprimulgus salvadori Sharpe, Proc. Zool. Soc., 1875, p. 99, pl. 22, fig. 1 (Labuan).

2 ♂ Benoni and Rayoh; 1 ♂ Banguey Island.

"Iris dark; bill black; feet brown."

T. L. —, 285, 280; W. 192, 190, 187; T. —, 145, 143; Ts. —, —, 17; B. f. g. —, 33, 34 mm.

C. m macrurus is found in Palawan where it occurs side by side with the closely allied *manillensis* Wald

MICROPODIDAE

53. **Hirundapus leucopygialis** (Blyth).

Cypselus coracinus Bp., Consp., 1850, p. 64: Borneo.

1 ♂ Bettotan.

"Iris dark; bill black; feet fleshy black."

T. L. 120; W. 119; T. 46; Ts. 10; B. f. g. 13.5 mm.

If Bornean birds differ from Malayan, which can only be a question of the colour of the gloss on the plumage, the name *coracinus* Bp., is available.

No form of this species is known from the Philippines.

54. **Collocalia brevirostris lowi** (Sharpe).

2 ♂, 1 ♀ Bettotan.

♂. "Iris dark; bill and feet black."

♀. "Feet crimson-black."

Males.—T. L. 126, 126; W. 127, 125; B. f. g. 13, 14 mm.

Female.—W. 127; Ts. 10; B. f. g. 12 mm.

This species is found in Palawan as *C. b palawanensis* Stresem.

55. Hemiprocne longipennis harterti Stresem.

Hemiprocne longipennis harterti Stresemann, Nov. Zool., XX, 1913, p. 339 (Sumatra).

1 ♀ imm. Bettotan; 1 ♂ Banguey Island; 1 ♀ Balambangan Island.

Male.—T. L. 212; T. 112; W. 172; Ts. —; B. f. g. 21 mm.

Female.—T. L. 208; T. 98; W. 169; Ts. —; B. f. g. 21 mm.

The young male has the wing measuring 175 mm.

"Iris dark; bill black; feet leaden or blackish brown."

The wing-range of the few Bornean birds known to us is 168 - 175 mm., and that of much larger series from Sumatra 159 - 175 mm., and from the Malay Peninsula 153 - 165 mm., but Stresemann (who included Borneo in the range of *harterti*, but apparently had no specimens before him) mentions a bird from Burma with the wing measuring 171 mm.

Continental birds show a low minimum but *harterti* must include all non-Javan and Bali birds (differing in colour) other than *perlonga* Richmond, of Similar Island (and Engano Island?), which has a wing of 184 mm.

No form of this species is known from the Philippines

56. Hemiprocne comata comata (Temm.).

4 ♂, 5 ♀ Bettotan and Rayoh.

"Iris dark; bill black; feet crimson-black or dark brown."

Males.—T. L. 155, 148, 155; W. 122, 120, 130; T. 75, 73, 77; B. f. g. 17, 17, 18 mm.

Females.— T. L. 165, 155, 155, 145, 132; W. 125, 130, 125, 127, 125; T. 78, 80, 77, 72; B. f. g. 18, 16, 15.5, 17, 18 mm.

The wing-ranges of our series are:—Sumatra 119 - 130; Malay Peninsula 118 - 125; Sarawak 124 - 125; North Borneo 122 - 130 mm.

H. c. comata is found in Sibutu and North to Samar, but the species is not represented in Palawan although *H. c. major* Hart occupies the remainder of the Philippines.

TROGONIDAE

57. Pyrotrogon diardi diardi (Temm.).

7 ♂, 2 ♀ Samawang River and Bettotan.

"Iris red or brown; eyelids and bare skin violet; bill blue, tip, edges and culmen black; feet greyish or pinkish brown, dark fleshy brown or purplish flesh."

Males.—T. L. 315, 338, 310, 315, 310, 284, 338; W. 139, 148, 140, 149, 136, 140, 138; T. 165, 176, 170, 170, 170, —, 178; Ts. 14, 16, 14, 13, 15, 14, 15; B. f. g. 29, 33, 31, 29, 29, 28, 32 mm.

Females.—T. L. 308, 324; W. 142, 142; T. 165, 176; Ts. 16, 15; B. f. g. 30, 32 mm.

There are no trogons in Palawan or Sibutu.

58. **Pyrotrogon kasumba** (Raffles).

3 ♂, 4 ♀ Samawang River, Bettotan and Rayoh.

♂. "Iris dark, eyelids and bare skin violet or blue; bill blue, tip, culmen and edges black; feet violet-blue or plumbeous."

♀ "Feet plumbeous."

Males.—T. L. 303, 288, 308; W. 134, 134, 139; T. 160, 164, 170; Ts. 14, 13, —; B. f. g. 28, 27, 30 mm.

Females:—T. L. 292, 295, 290, 303; W. 132, 140, 136, 140; T. 150, 168, 165, 168; Ts. 14, 15, 11, 14; B. f. g. 27, 26, 24, 24 mm.

59. **Pyrotrogon duvauceli** (Temm.).

4 ♂, 3 ♀ Samawang River and Bettotan.

"Iris dark, bare orbital skin turquoise; bill blue, edges and culmen black; bare skin at base of beak violet; feet plumbeous or blue."

Males.—T. L. 235, 228, 235, 240; W. 101, 103, 100, 100; T. 125, 133, 128, 136; Ts. 9, 11, 11.5, 10; B. f. g. 23, 23, 24, 25 mm.

Females.—T. L. 240, 227, 227; W. 107, 103, 104; T. 130, 118, 125; Ts. 10, 9, 11; B. f. g. 23, 24, 23 mm.

60. **Pyrotrogon orrophæus vidua** (Grant).

2 ♂ Bettotan.

"Iris dark; bill black, grey at the base; bare skin blue; feet plumbeous."

T. L. 240, 220; W. 106, 110; T. 125, 116; Ts. 14, 13; B. f. g. 21, 19 mm.

The females listed by Grant in the Catalogue of Birds (xvii, p. 501) came from Mt. Dulit, 4,500 feet, and Mt. Kinabalu, 4,000 ft. We have no absolute topotypes but the only difference we can perceive between Bettotan specimens, other North Bornean males and a male from East Borneo (1172 metres) and the male of the Malayan *orrophaeus* is that the last is more finely barred on the wing-coverts. *P. vidua* as represented by our material is, however, just distinct: its presence in the lowland indicates that it is the Bornean race of *orrophaeus* and that skins from Central Borneo recorded as *orrophaeus* by Buttikofer belong to it. We have also seen it from Mt. Penrissen in South-west Sarawak.

CUCULIDAE

61. **Surniculus lugubris brachyurus** Stresem.

Surniculus lugubris brachyurus Stresem., Nov. Zool., xx, 1913, p. 340 (Pahang, Malay Peninsula).

1 ♂, 1 ♀ Samawang River and Rayoh.

"Iris dark; bill black; feet blackish plumbeous."

Male.—T. L. 229; W. 125; T. 122; B. f. g. 27 mm.

Female.—T. L. 235; W. 125; T. 120; Ts. 16; B. f. g. 26 mm.

This species occurs in Palawan as *S. l. minimus* Baker.

62. **Hierococcyx nanus** Hume.

2 ♂ Bettotan.

"Iris dark; eyelid yellow; maxilla black; mandible dull ochre or green; feet yellow."

T. L. 250, 200; W. 137, 136; T. 135, 126; Ts. 16, 17; B. f. g. 29, 30 mm.

H. nanus is not known from the Philippines

63. **Cacomantis merulinus** subsp.

C. dysonymous Heine, Journ. f. Orn. 1863, p. 352 (Borneo, Java, Sumatra).

1 ♂ Samawang River. (Lower breast and abdomen rather pale).

"Iris red; maxilla black; mandible dusky; feet pale ochre."

T. L. 210; W. 103; T. 108; Ts. 28; B. f. g. 24 mm.

Stresemann* included birds from Sumatra, Borneo and Java under *merulinus* of the Philippines and considered that Malayan specimens were best designated as *C. m. merulinus* >< *querulus*: Hartert† kept birds from Borneo and Java under *merulinus* and applied *threnodes* to those from Sumatra and the Malay Peninsula: Robinson and Kloss have recorded birds from the two last localities as *C. m. threnodes* also‡ while they have called Javanese birds *C. m. lanceolatus* (S. Mull.)§.

We can see no difference between specimens from the Malay Peninsula, Sumatra and Borneo all being very variable in the colour of the underparts: if distinct from the Philippine bird they will stand as *C. m. threnodes* Cab. and Heine. The pallid Javan race is strikingly distinct · we have a few birds from various localities in

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*Nov. Zool., xix, 1912, p 332.

†Nov. Zool., xxxii, 1925, p. 164

‡Ibis, 1918, p. 98; Journ. Fed. Malay States Mus. xi, 1924, p. 249

§Treubia, 1924, p. 276.

Java, from east to west, and they certainly could not be confused with any others before us on account of their pale grey breasts and pale buff abdomens.

Palawan is apparently occupied by typical *merulinus*.

64. **Cacomantis variolosus sepulcralis** (S. Mull.).

Cacomantis sepulcralis sepulcralis Stresem., Nov. Zool., xix, 1912, p. 334.

Cacomantis variolosus sepulcralis Hart., Nov. Zool., xxxii, 1925, p. 165.

1 ♂ Rayoh.

"Iris brown; maxilla black; mandible dark brown; feet yellow."

T. L. 221; W. 115; T. 120; Ts. 28; B. f. g. 24 mm.

C. sepulcralis has been recorded from Borneo by P. L. Sclater (P. Z. S., 1863, p. 209), but its occurrence has been queried by the later reviewers*. There seems no doubt about the present specimen.

C. v. sepulcralis is also recorded from the Philippines although we cannot find a definite record for Palawan. The Sulu Island bird has been separated as *everetti* Hartert, but it has not been recorded from Sibutu.

65. **Chalcites (Chalcococcyx) xanthorhynchus bangueyensis** Chas and Kloss.

Chalcites (Chalcococcyx) xanthorhynchus bangueyensis Chasen and Kloss, Journ. für Ornith. 1929, Band 2, p. 109.

Types. ♂ and ♀ ad. Banguey Island, September, 1927.

2 ♂, 1 ♀ Banguey Island.

♂. "Iris and eyelid crimson; bill deep yellow, base blood-red; feet dull olive."

♀. "Iris and eyelid crimson maxilla black, base at the sides red; mandible brownish yellow; base red; feet olive."

Males.—T. L. 168, 170; W. 97, 95; T. 67, 67; Ts. —, 14; B. f. g. —, 21 mm. (The measurements of the male type are given first).

Female.—T. L. 172; W. 99; T. 75; Ts. 14; B. f. g. 21 mm.

These birds differ from topotypes of the species and others from the Malayan and Sumatran areas in having much less white on the tail feathers of both sexes. All the males of *C. x. xanthorhynchus* have the white spots (of which there are four) on the outer webs of the outermost pair of tail feathers comparatively large and most of them continuing on to the inner web (except in one topotype) though reduced in size there; there are in addition terminal spots on the two outer pairs of rectrices only.

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*Sharpe redetermined Sclater's specimen as *C. merulinus*.

McGregor describes Philippine males as having the outermost rectrices with three white spots on the outer webs and the three outer pairs tipped with white.

These, we suggest, should stand as *C. x.* ***amethystinus*** (Vigors) based on a Luzon bird.

The Banguey males have four small spots confined to the outer web of the outermost rectrices and the terminal spots on the second outer pair obsolete or absent.

The females of *C. x. xanthorhynchus* have the outermost rectrices largely white and large terminal spots on the three outer pairs. The Philippine female seems unknown. The Banguey female has the outermost rectrices largely chestnut and has white terminal spots on two pairs of rectrices only.

The differences seem sufficient to justify separation.

In addition to five topotypical birds we have examined *C. x. xanthorhynchus* from the Mentawi Islands, West Sumatra; the Malay Peninsula; all Sarawak; and Middle East Borneo.

"*C. xanthorhynchus*" has been recorded from Palawan.

66. **Centropus sinensis bubutus** Horsf.

1 ♂ imm., 3 ♀ ad., 1 ♀ imm. Bettotan and Rayoh.

"Iris red; bill and feet black."

Adult females.—T. L. 550, 550, 540; W. 215, 229, 210; T. 303, 300, 300; B. f. g. 47, 49, 46 mm.

A form of this species occurs in Palawan.

67. **Zanclostomus javanicus pallidus** Rob. and Kloss.

Zanclostomus javanicus pallidus Rob. and Kloss, Journ. F. M. S. Mus., x, 1921, p. 203 (Kedah Peak, Malay Peninsula).

1 ♂ Bettotan; 1 ♀ Rayoh.

♂. "Iris dark; eyelid blue; bill red; feet dark plumbeous."

♀. "Iris scarlet; bill red; feet blue."

Male.—T. L. 392; W. 135; T. 225; Ts. 33; B. f. g. 37 mm.

Female.—T. L. 413; W. 142; T. 235; Ts. 45; B. f. g. 39 mm.

Robinson* has stated that birds from Sumatra and Borneo differ somewhat from the Malay Peninsular and Javan birds but excepting for their rather small size the few Bornean specimens we have seem exactly like topotypes of *pallidus*.

68. **Rhopodytes diardi borneensis** Salvad.

2 ♂, 2 ♀ Bettotan.

"Iris pale blue; bare skin crimson; bill apple green; pale bluish behind nostril; feet leaden."

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*The Birds of the Malay Peninsula, II, 1928, p. 78.

Males.—T. L. 346, 342; W. 126, 120; T. 205, 204; Ts. 34, 30; B. f. g. 36, 34 mm.

Females.—T. L. 340, 355; W. 122, 125; T. 197, 211; Ts. 33, 31; B. f. g. 35, 34 mm.

We cannot regard *borneensis* as anything more than a subspecies of *diardi*. It is found throughout Borneo: "*diardi*" has been recorded thence by Büttikofer*, Hose† and Moulton‡ but we suspect that, precisely speaking, all are in error.

No form of this species occurs in the Philippines.

69. **Rhopodytes sumatranus** (Raffles).

1 ♂, 2 ♀ Benoni.

Male.— W. 144 mm.

Female.— W. 145, — mm.

Two of these birds are partially albino. One female has one of the tail-quills and some of the primaries, secondaries and scapulars broadly barred with white and the male has, in addition, some of the feathers of the crown and the wing-coverts tipped with white.

The species is not known from the Philippines.

70. **Rhinortha chlorophæa chlorophæa** (Raffles).

10 ♂ ♀, 10 Samawang River, Bettotan, Benoni, Kota Belud and Rayoh.

1 ♂, 2 ♀ Banguey Island.

"Iris dark; eyelids and bare orbital skin chalky green; bill apple green; feet plumbeous."

Males.—T. L. 312, 308, 320, 307, 295, 315, 295, 288, 300, 310; W. 108, 110, 116, 111, 112, 108, 115, 110, 110, 115; T. 168, 170, 173, 173, 170, 170, 168, 154, 165, 175; Ts. 26, 27, 27, 27, —, 25, 28, 28, 26, 27; B. f. g. 32, 33, 33, 33, 34, 35, 33, 32, 31, 32 mm.

Females.—T. L. 314, 318, 298, 317, 305, —, 316, 305, 327, 303, 313; W. 119, 113, 114, 112, 112, 112, 112, 112, 116, 112, 110; T. 180, 180, 167, 174, 175, —, 180, 169, 187, 168, 173; Ts. 29, 28, 25, 27, 26, 29, 25, 28, 27, 27.5, 25.5; B. f. g. 32, 35, 32, 34, 34, 35, 32, 33, 34, 33, 33 mm.

(The measurements of the Banguey birds are given last).

The females of this species, both in Borneo and the Malay Peninsula, show a good deal of individual variation: they range from examples having pure grey throats, forenecks and breasts, to others in which these parts are strongly washed with the ferruginous buff of the upper abdomen. These last have been named *R. c. fuscigularis.** The gradual transition from one extreme to the other is complete in the considerable series before us, which match each other, from the two areas mentioned above. If *fuscigularis* is to be maintained it will have to include Malayan as well as Bornean birds, though Baker says the latter differ from those found in any other locality. A series of Sumatran topotypes is required before the point can be settled: at the moment only one skin is available and it is a grey-throated bird: but Robinson and Kloss have on several occasions recorded *R. c. chlorophaea* from various places in Sumatra and have not noted any differences between them and Malayan examples.

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*Notes Leyden Mus., ix, 1887, p. 31.

†Ibis, 1893, p. 415.

‡Journ. Straits Br. Roy. Asiat. Soc., 67, 1914, p. 154.

71. **Phoenicophaus curvirostris borneensis** (Blas. and Nehr.).

Rhamphococcyx erythrognathus var. *borneensis* Blasius and Nehrkorn, Jahresbr. des Vereins Nat. Braunschweig, 1881, p. 19 (Sarawak).

Phoenicophaës microrhinus Berlepsch, Nov. Zool., II, 1895, p. 70: Borneo.

4 ♂, 3 ♀ Bettotan, Benoni and Kota Belud; 1 ♂ Banguey Island.

♂. "Iris blue; orbital skin crimson; maxilla apple green, base at the sides crimson; nostril black; mandible crimson, tip green; feet plumbeous."

♀. "Iris yellow; orbital skin crimson; bill apple green, nostril and distal half of the mandible brownish crimson (vix. ad.).

♀. "Iris orange or orange-red; maxilla apple green; base at sides red; mandible red, tip green; feet dark, dull plumbeous" (adult).

Males.—T. L. 432, 445, —, —, 395; W. 167, 159, 165, 164, 154; T. 240, 250, —, —, 215; Ts. 39, 40, —, —, 48; B. f. g. 43, 47, —, —, 45 mm.

Females.—T. L. 425, 410, 410; W. 152, 155, 162; T. 240, 222, 218; Ts. 39, 38, 42; B. f. g. 44, 44, 45 mm.

Birds from North Borneo and Sarawak are alike.

Dryococcyx harringtoni can perhaps be regarded as the Palawan representative of this species.

CAPITONIDAE

72. **Calorhamphus fuliginosus tertius** Chas. and Kloss.

Calorhamphus fuliginosus tertius Chasen and Kloss, Journ. für Ornith., 1929, Band 2, p. 110.

Like *C. f. fuliginosus* of Sarawak but the red of the underparts restricted to the chin and throat, and the sides of the head much less red; abdomen more washed with sulphur yellow. Throat much deeper red than in *C. f. hayi* of the Malay Peninsula.

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*Baker, Bull. B. O. C., XXXIX, 1919, p. 77 (Sarawak).

Type. ♂ ad. Bettotan near Sandakan, British North Borneo, 20th August, 1927.

4 ♂, 4 ♀ Bettotan; 7 ♂, 1 ♀ Rayoh, south of Jesselton.

"Iris brown; maxilla reddish brown, culmen and base black; mandible reddish brown; feet scarlet." (The native collector of the Rayoh series noted the iris as "vegetable green" in all cases).

Males.—T. L. 180, 175, 179, 176; W. 84, 78, 78, 80; T. 54, 55, 53, 52; Ts. 23, 19, 20.5, 20; B. f. g. 28, 30, 29, 30 mm. (The measurements of the type are given first).

Females.—T. L. 173, 182, 170, 168; W. 80, 80, 77, 77; T. 52, 54, 54, 51; Ts. 19, 23, 21, 21; B. f. g. 27, 30, 29, 27 mm.

The above measurements are of the Bettotan specimens.

The Rayoh birds have the wings measuring: ♂, 83, 78, 86, 77, 82, 82, 84; ♀, 80 mm.

It is curious that this race of a common lowland bird should hitherto have remained unrecognised. All our birds are adult, none showing reddish edgings to the wing-coverts. On the series before us, in no case could birds from Sarawak and North Borneo be confused, even immature examples of typical *fuliginosus* having the centre of the abdomen tinged with red. The northern birds are also much more olive and less brown above than those from Sarawak, but the former are the fresher skins and we doubt if this is a racial character.

Sarawak birds are clearly the more richly coloured typical form from the west coast of Borneo ("On voit encore une légère teinte de cette couleur [rouge de brique] sur la ligne moyenne du ventre").

Sumatran birds (*C. sanguinolentus* Less.) are not worthy of separation from *C. hayi* though, as Robinson and Kloss have noted* of a series from Korinchi, "all the skins can be exactly matched by others in a large series from the Federated Malay States, though the red of the throat is certainly slightly more intense than in the majority of Malayan specimens".

The colour of the bill in this species is perhaps of racial importance: in many Malayan birds it is black.

Not known from the Philippines.

73. **Chotorhea chrysopogon chrysopsis** (Goffin).

2 ♂, 2 ♀ Bettotan.

"Iris brown; maxilla black; mandible black, base grey; feet olive."

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*Journn. F. M. S. Mus, VIII, pt. 2, 1918, p. 140.

Males.—T. L. 272, 272; W. 120, 118; T. 78, 74; Ts. 30, 31; B. f. g. 53, 54 mm.

Females.—T. L. 267, 285; W. 115, 115; T. 70, 72; Ts. 32, 31; B. f. g. 53, 51 mm.

This is a good race separable from typical *chrysopogon* of Sumatra by the more pronounced yellow colour of the frontal band: the occiput is also rather less red and more blue, but this latter is not a good character.

Malayan birds (*laetus* Rob. and Kloss) have the forehead like typical *chrysopogon* but the malar patch a deep yellow.

Chotorhea is not known from the Philippines.

74. **Chotorhea mystacophanes mystacophanes** (Temm.).

5 ♂, 3 ♀ Bettotan; 1 ♂, 1 ♀ Rayoh.

"Iris dark; bill black; feet olive."

♀. "Mandible grey with black tip."

Males.—T. L. 235, 220, 223, 226, 215, --; W. 100, 97, 93, 93, 93, 94; T. 68, 68, 67, 58, 60, 63; Ts. 28, 28, 29, 23, 26, —; B. f. g. 46, 43, 43, 45, 43, 40 mm.

Females.—T. L. 226, 224, 224, 228; W. 94, 93, 96, 103; T. 63, 64, 60, 72; Ts. 28, 26, 28, —; B. f. g. 48, 45, 44, 46 mm.

A large series from the Malay Peninsula, Sarawak and North Borneo seems inseparable. The intensity of the yellow on the forehead and the amount of blue on the throat in males, and the amount of red on the crown in females are very variable characters in the skins from Bettotan.

75. **Cyanops henrici brachyrhyncha** Neumann.

Cyanops henricii brachyrhyncha Neumann, Bull. B. O. C., xxiii, 1908, p. 30 (Baram, Sarawak).

1 ♀ Bettotan.

"Iris dark; bill black; feet olive."

T. L. 200; W. 89; T. 58; Ts. 24; B. f. g. 35 mm.; bill from nostril 18 mm.

This barbet seems to be curiously rare in Borneo where it occurs in the lowlands. It was first collected in the island by Treacher, and Büttikofer called attention to the short bill of the Bornean bird as long ago as 1899.* The only other specimen we have from Borneo is a male from Sarawak. It measures, wing 89 mm., bill from nostril 18.5 mm. Neumann gives the wings of nine topotypes as 91 - 95 mm.

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*Notes Leyden Mus., xxi, p. 161.

We have no Sumatran material of *henrici* but our series of Malayan adults have the wing-range 95 - 101 mm., bill from nostril 20 - 22 mm. The difference in the figures for the bills may seem insignificant, but in the skins the much less robust bill of *brachyrhyncha* is very notable. It has also a shorter wing.

While we think that *C. armillaris* (Temm.) represents in Java *C. henrici* and *C. h. brachyrhyncha* we think it best to treat these last as forming a distinct species on account of the very different coloured collar and foreneck.

Cyanops is not known from the Philippines.

76. Mesobucco duvauceli duvauceli (Less.).

Megalaema duvauceli borneonensis Parrot, Abh. K. Bayer, Akad. Wiss., Klasse ii, xxiv, 1907, p. 171 (North Borneo).

Cyanops duvauceli borneonensis Hartert, Nov. Zool., xxxii, 1925, p. 140.

1 ♂ Samawang River.

"Iris dark brown; bill dark blue; feet green."

It is extremely doubtful whether birds from the southern part of the Malay Peninsula and Borneo are separable from typical *duvauceli* of Sumatra and if any races are recognised they can only be based on very thin average characters. Malayan birds are perhaps rather larger than topotypes and black ear-coverts are perhaps more dominant in Borneo than elsewhere but on the series before us, including many from the mainland, seventeen from Borneo but for the moment only four from Sumatra, we can make no separation. The races of this barbet have been much discussed lately.*

No form is known from the Philippines.

PICIDAE

77. Picus puniceus observandus (Hartert).

Gecinus puniceus observandus Hart., Nov. Zool., iii, 1896, p. 542 (Sumatra).

2 ♂, 2 ♀ Bettotan and Kota Belud.

"Iris red; orbital skin blue; maxilla blackish, base at edge yellow; mandible yellow or greenish yellow; feet olive brown."

"Iris brown; orbital skin greenish slate" (*younger bird*).

Males.—T. L. 233, 231; W. 116, 113; T. 87, 76; Ts. —, 22; B. f. g. 30, 29 mm.

Females.—T. L. 239, —; W. 114, —; T. 84, —; Ts. 21, —; B. f. g. 29, — mm.

**Vide* Rob. and Kloss, Journ. Nat. Hist. Soc. Siam, v, 1922, p. 166, The characters of the Malaysian races of this woodpecker have been summarized by Robinson and Kloss in Journ. Fed. Malay States Mus., x, 1921, p. 204.

No Philippine form.

78. **Callolophus miniatus dayak** Stresemann.

Callolophus miniatus dayak Stresemann, Archiv. fur Naturgeschichte, 1921, p. 82 (Landak River, West Borneo).

1 ♂, 1 ♀ Bettotan.

"Iris red; maxilla black; mandible grey; feet olive brown."

Male.—T. L. 238; W. 116; T. 78; Ts. 21; B. f. g. 29 mm.

Female.—T. L. 238; W. 118; T. 83; Ts. 22; B. f. g. 28 mm.

This Bornean race is small; eight adults from Sarawak have wings measuring 117 - 124 mm.

No Philippine form.

79. **Chrysophlegma mentale saba** Chas. and Kloss.

Chrysophlegma mentale saba Chasen and Kloss, Journ. für Ornith., 1929, Band 2, p. 111.

Like *C. m. humei* of the Malay Peninsula but smaller.

Type. ♂ ad. Samawang River, near Sandakan, British North Borneo, 13th July, 1927.

3 ♂, 2 ♀ Samawang River and Bettotan.

"Iris red or brown; orbital skin olive; maxilla black, mandible grey; feet olive."

Males.—T. L. 283, 272, 263; W. 123, 120, 123; T. 103, 95, 90; Ts. 22, 23, 24; B. f. g. 37, 37, 39 mm. (The measurements of the type are given first).

Females.—T. L. 264, 255; W. 124, 119; Ts. 22, 23; B. f. g. 35, 34 mm.

The type of *humei* came from Malacca and birds from the Malay Peninsula, Sumatra and Sarawak are inseparable on size or colour. The wing measurements of the large series in the Raffles Museum are: Malay Peninsula, ♂ 130 - 141, ♀ 130 - 139; Sarawak ♂ 133 - 139 (128 once), ♀ 125 - 131 (122 once); Sumatran birds, fide Stresemann, measure ♂ 132 - 136, ♀ 127 - 132 mm.

Birds from North Borneo with a wing-range of, ♂ 120 - 123, ♀ 119 - 124 mm. are therefore best separated. A minor difference between *saba* and *humei* on the material before us is that in males of *humei* the ground colour of the speckled area running back from the base of the bill is blackish brown sometimes mixed with chestnut, whereas in *saba* this area is washed with green.

No Philippine form.

80. Chloropicoides rafflesi borneonensis (Hesse).

1 ♂, 1 ♀ Bettotan.

"Iris dark; orbital skin dusky; maxilla black; mandible black; base grey; feet dull olive."

Male.—T. L. 273; W. 125; T. 109; Ts. 23; B. f. g. 35 mm.

Female.—T. L. 265; W. 125; T. 97; Ts. 22; B. f. g. 32 mm.

The Bornean race is rather small. Some Sarawak birds in our possession have the wings measuring ♂ 128 - 132; ♀ 134 mm.

No Philippine form.

81. Dryobates moluccensis moluccensis (Gm.).

1 ♂ Benoni.

1 ♀ Balambangan Island.

"Bill black; feet greyish olive."

T. L. 138; W. 77, 75; T. 36, 42; Ts. 14, 14; B. f. g. 20, 18 mm.

Riley has named East Bornean birds *Yungipicus moluccensis tantulus** but we cannot separate birds from Java, Borneo, the Malay Peninsula and Sumatra. Mr. H. C. Robinson informs us that *Tripsurus auritus* Eyton, hitherto considered as this bird, is really the form of *D. canicapillus*, recently named *suffusus*† by Robinson and Kloss. Kuroda‡ has lately used *picatus* Hargitt for a bird of this genus obtained at Tawao in North Borneo but his specimen may be an immature *D. canicapillus aurantiiventris* Salvad.

Not represented in Sibutu or Palawan.

82. Blythipicus rubiginosus parvus Chas. and Kloss.

Blythipicus rubiginosus parvus Chasen and Kloss, Journ. für Ornith., 1929, Band 2, p. 112.

Like *B. r. rubiginosus* of Malacca but smaller

Type. ♂ ad. Bettotan, near Sandakan, British North Borneo 22nd August, 1927.

5 ♂, 3 ♀ Bettotan and Kota Belud.

"Iris red; bill yellow, greenish at the base; feet black."

Males.—T. L. 220, 225, 208, 222, 203; W. 111, 116, 116, 112, 109; T. 70, 65, —, 73, 63; Ts. 23, 22, 22, 22; B. f. g. 36, 38, 38, 36, 34 mm. (The measurements of the type are given first).

Females.—T. L. 222, 215, —; W. 117, 119, 114; T. 78, 68, —; Ts. 22, 23, —; B. f. g. 35, 35, — mm.

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*Proc. Biol. Soc. Washington, 40, 1927, p. 140 (Mahakkam, or Koetei River, E. Borneo).

†Bull. Brit. Orn. Club, xl, 1919, p. 14.

‡Tori, iv, 1925, p. 7.

The plumage of this species seems very constant throughout its range: there is variation in the colour of the head, some birds from the Malay Peninsula being very dark when compared with one or two from North Borneo, but on reviewing our large series it seems impossible to correlate any colour differences with geographical range. Nevertheless a division of the species on size must be made and the following wing-ranges (in all cases founded on large series) show that the island birds run rather small:

Malay Peninsula 122 - 130 mm.

Borneo and Sumatra 109 - 122 mm.

Unfortunately *rubiginosus* Swainson cannot be fixed on Borneo or Sumatra thus leaving *melanogaster* Hay for the continental race: Hartlaub (Rev. Zool., 1844, p. 402) stated quite definitely that *rubiginosus* came from Malacca.

No Philippine form.

83. **Meiglyptes tristis micropterus** Hesse.

4 ♂, 3 ♀ Samawang River, Rayoh and Bettotan.

1 ♀ Banguey Island.

"Iris brown; bill black, mandible sometimes leaden; feet dull olive."

Males.—T. L. 170, 157, 165, 162; W. 91, 94, 95, 91; T. 47, 48, 50, 47; Ts. 18, —, —, 19; B. f. g. 24, 22, 22, 21 mm.

Females.—T. L. 162, 166, 168, 168; W. 88, 92, 91, 93; T. 42, 50, 45, 49; B. f. g. 22, 22, 23, 23 mm.

(*The measurements of the female from Banguey are given last*).

From literature and available specimens the wing-range of Bornean birds seems to be exactly the same as that of *micropterus* of Sumatra, *viz.*, 87 - 97 mm.: *M. t. grammithorax* reaches more than 100 mm. in wing-length. There would seem little advantage in recognising races on so small a difference in the maximum wing-length but continental birds *average* larger, having a considerably higher minimum, than those from the two islands. Continental birds have the irides red, but in all the specimens from North Borneo the irides were noted in the field as "dark" or "brown".

No Philippine form.

84. **Meiglyptes tukki tukki** (Less.).

12 ♂, 2 imm. ♂, 3 imm. ♀ Samawang River, Bettotan and Rayoh.

"Iris dark brown or red; maxilla black; mandible grey; feet olive brown."

Adult Males.—T. L. 220, 200, 207, 206, 207, 206, 205, 202, 198, 204, 197; W. 102, 98, 104, 101, 95, 100, 104, 104, 100, 97, 102; T. 75, 63, 67, 67, 68, 63, —, 66, 67, 75, 62; Ts. 75, 63, 67, 67, 68, 63, —, 66, 67, 75, 62; B. f. g. 28, 27, 27, 27, 26, 27.5, —, 28, 27, 27, 27 mm.

With one exception the adults of this series, all males, are fairly constant in plumage: all have the pale areas well suffused with olive and none shows the brownish tinge so often to be remarked in this woodpecker. The exception is very much darker in general tone than the others; it has the pale patch on the neck white rather than yellowish and the plumage shows no trace of the greenish wash; the barred area on the throat is reduced, the foreneck is extensively black and the barring of the underparts is generally much less obvious than in normal birds; the crown is not washed with red and there seems no reason for regarding this bird as immature. It is, apparently, only an extreme of a species which our series from the Malay Peninsula shows to be very variable.

Oberholser has described *percnerpes** from Batu Jurong in S. W. Borneo: all our Bornean birds are from Sarawak and North Borneo and these together with a large series from the Malay Peninsula are not separable from typical *tukki* of Sumatra

No Philippine form.

85. **Meiglyptes tukki pulonis** Chas. and Kloss.

Meiglyptes tukki pulonis Chasen and Kloss, Journ. für Ornith., 1929, Band 2, p. 112.

Like *M. t. tukki* of the Malay Peninsula but generally browner and less olive in tone; the throat paler; the pale area on the neck whitish or tinged with brown and never with yellow; pale bars on the upper surface browner and less yellow. Bill, and perhaps general size, rather larger.

Type. ♂ ad. Banguey Island, North Borneo, 2nd Sept. 1927.

3 ♀, 2 ♂, imm. ♂. Banguey Island.

"Iris crimson; maxilla black; mandible pale grey; feet leaden brown, olive brown, dark brown or dark greenish brown."

We have carefully examined all the many available skins of this variable species and find that even if the five adults from Banguey are compared with the most faded and extreme modifications of plumage shown in series from elsewhere, the former can still be recognised, especially by their paler throats.

The bills of the Banguey specimens measure 20 - 23 mm. from the anterior edge of the nostrils and are larger than Bornean and continental birds, few of which attain a length of 21 mm. while none exceeds it. Typical *tukki* has a wing-range of 92 - 102 (108 once, fide Stresemann); birds from the Malay Peninsula measure 97 - 106 mm. (112 once) and from Borneo (Sarawak and North Borneo) 97 - 104 mm. Banguey birds, with the wings measuring 105, 106, 109, 109 and 110, are therefore rather large. Stuart Baker gives 96 - 111 mm. as the wing range of Bornean birds*.

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*Journ. Wash. Acad. Sci., 14, 1924, p. 301.

No Philippine form.

86. **Micropternus brachyurus badiosus** (Temm.).

1 ♂, 1 ♀ Bettotan; 1 ♀ Rayoh.

"Iris red; bill black; feet dark brown."

Male.—T. L. 218; W. 113; T. 62; Ts. 21; B. f. g. 29 mm.

Females.—T. L. 212, 205; W. 112, 112; T. 62, 65; Ts. 19, —, B. f. g. 28, 29 mm.

The male has the nape washed with red. The general tone of the plumage is unusually variable in the Bornean race and some examples are much darker and richer brown than others.

No Philippine form.

87. **Dinopium javanense borneonensis** (Dubois).

1 ♂ Benoni.

Wing, 127 mm.; Tail, 95 mm.

This specimen like a pair from Tuaran, near Jesselton, has the mantle without trace of red thereby differing from the large majority (but not all) of a good series of adult males of *javanense* (syn. *palmarum*). It also has the breast less heavily marked† than all but a few of the typical form and in view of Baker's remarks‡ on the species we use *borneonensis*.

T. everetti is the Palawan form of this species.

88. **Chrysocolaptes validus xanthopygius** Finsch.

Chrysocolaptes xanthopygius Finsch, Notes Leyd. Mus., 1905, p. 34 (Borneo).

2 ♂, 2 ♀ Samawang River and Bettotan.

♂. "Iris brownish yellow or grey; maxilla dark brown or black; mandible yellow, tip brownish or all olive yellow; feet dark olive or olive brown."

♀. "Iris hazel; maxilla blackish or brown; mandible dirty greenish white or ivory; feet plumbeous brown or black."

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*Fauna Brit. Ind., Birds, 2nd ed., IV, p. 59.

†Cf. *Dinopium raveni* from Pulau Eraban, N. E. Borneo, Riley, Proc. Biol. Soc. Wash., 40, 1927, p. 139; and Robinson, Bull. B. O. C., xlviii, 1928, p. 71.

‡Ibis, 1919, p. 207.

Males.—T. L. 300, 280; W. 152, 145; T. 95, 78; Ts. 30, 29; B. f. g. 53, 46 mm.

Females.—T. L. 300, 301; W. 150, 148; T. 95, 96; Ts. 28, 27: B. f. g. 49, 49 mm.

No Philippine form.

89. **Hemicircus concretus coccometopus** Rchb.

Hemicircus coccometopus Reichenbach, Scans. Picinæ, 1854, p. 401 (Sumatra: Stresemann 1921).

1 ♀ Bettotan.

"Iris brown; bill and feet greyish black."

Female.—T. L. 137; W. 84; T. 32; Ts. 16; B. f. g. 20 mm.

H. coccometopus is a "thin" race only standing on lesser average size: the wing-range of Sumatran topotypes is 81 - 86 mm. Fifteen birds from Borneo have a wing-range of 80 - 85 (87 once). Malay Peninsula birds (*sordidus*) measure 81 - 89 mm. but the large majority are over 85 mm. If Bornean birds differ from Sumatran specimens they are *brookeanus* Salvad. (*vide* Robinson and Kloss, Journ. Nat. Hist. Soc. Siam, v, 1922, p. 198), but this is not likely as we can detect no difference other than size between series from Borneo and Sumatra and from the Malay Peninsula.

No Philippine form.

90. **Dryocopus javensis javensis** (Horsf.).

1 ♂, 1 ♀ Banguey Island.

"Iris yellow; bill black; feet grey-black."

Male.—T. L. 465; W. 228; T. 175; Ts. 37; B. f. g. 61.5 mm.

Female.—T. L. 455; W. 223; T. 188; Ts. 36; B. f. g. 60 mm.

A widely distributed species in the Philippines represented in Palawan by *D. j. hargitti* Sharpe.

91. **Sasia abnormis abnormis** (Temm.).

2 ♂, 5 ♀ Samawang River, Bettotan and Rayoh.

"Iris red; orbital skin plum-colour or livid crimson: maxilla black; mandible pale greenish yellow; feet deep yellow."

Males.—T. L. 87, 88; W. 53, 53; T. 21, 21; Ts. 12, 13; B. f. g. 13.5, 14.5 mm.

Females.—T. L. 88, 88, 88, 87, 85; W. 54, 54, 52.5, 54, 55; T. 22, 22, —, 22, 21; Ts. 13, 12, —, 14, —; B. f. g. 16, 15, 16, 15.5, 16 mm.

No Philippine form.

EURYLAIMIDAE

92. Calyptomena viridis viridis Raffles.

1 ♂, 3 ♀ Samawang River, Bettotan and Rayoh.

"Iris dark; maxilla black, edges yellow or green; mandible olive or greenish olive, edges yellow or green; feet olive or olive-green."

Male.—T. L. 172; W. 101; T. 45; Ts. 20.5; B. f. g. 23 mm.

Females.—T. L. 196, 162, 186; W. 106, 100, 98; T. 59, 52, 52; Ts. 22, —, 21; B. f. g. 23, 23, 26 mm.

The female with the wing of 106 mm. is the largest example of *viridis* from Sumatra or Borneo that we have seen; the mainland *C. v. continentis* Rob. and Kloss* attains a wing-length of 113 mm.

No form of *Calyptomena* is known from the Philippines.

93. Eurylaimus javanicus brookei Rob. and Kloss.

Eurylaimus javanicus brookei Robinson and Kloss, Bull B. O. C., xl, 1919, p. 15 (Saribas, S. W. Sarawak).

5 ♂, 1 ♀, Samawang River and Bettotan.

"Iris grey or blue grey; bill blue, maxilla edged with yellow and black; mandible edged black; feet grey or pinkish grey."

Males.—T. L. 213, 213, 232, 215, 210; W. 103, 103, 106, 107, 109; T. 70, 64, 74, 68, 69; Ts. 25, 26, 25, 27, 24; B. f. g. 38, 39, 40, 39, 39 mm.

Female.—T. L. 218; W. 109; T. 72; Ts. 26; B. f. g. 37 mm.

The males of this series are at once separable from *harterti* of Sumatra and the Malay Peninsula by the pinker, less leaden throat, obsolescent black pectoral band, darker, more blackened, forehead and slightly greyer crown. The single female listed above is only separable from the female of *harterti* by the rather darker forehead and greyer crown and occiput.

No form of *Eurylaimus* is known from the Philippines.

94. Eurylaimus ochromalus kalamantan Rob. and Kloss.

Eurylaimus ochromalus kalamantan Rob. and Kloss, Bull. B. O. C., xl, 1919, p. 15 (Saribas District, Sarawak).

10 ♂ (imm.), 5 ♀ Bettotan, Samawang River and Rayoh.

"Iris yellow; bill blue, edges yellow and black; feet fleshy or grey-pink."

Males.—T. L. 165, 160, 163, 156, 162, 166, 162, 154, 160; W. 77, 78, 82, 80, 80, 78, 79, 78, 85; T. 52, 53, 55, 50, 54, 53, 51, 51, 50; Ts. 22, —, 24, 21, 21, 23, 20, 20, —; B. f. g. 26.5, 25, 28, 26, 28, 25, 29.5, 27, 29 mm.

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*Journ. Fed. Malay States Mus., xi, 1923, p. 54

Females.—T. L. 148, 153, 160, 160, 155; W. 76, 79, 79, 75, 77; T. 43, 50, 53, 48, 48; Ts. 17, 21, 21, —, 20; B. f. g. 25, 26, 26, 27, 25 mm.

Long series of this bird are available from the Malay Peninsula and Sarawak and on size they are undoubtedly worthy of separation, the wing-range of continental birds being 75 – 81 mm. against 81 – 89 for Sarawak. The above series from North Borneo with a wing-range of 75 – 85 mm. is scarcely so distinct as that from Sarawak, but as the maximum is greater than that for the Malay Peninsula it is perhaps as well to regard all Bornean birds as *kalamantan*. We can see no difference in colour between the two races.

95. Cymborhynchus macrorhynchus macrorhynchus (Gm.).

7 ♂, 4 ♀ Samawang River, Bengkoka River, Benoni, Kota Belud, Rayoh.

"Iris green; maxilla turquoise washed with cobalt or 'china-blue'; mandible yellow, edge turquoise; feet plumbeous blue."

Males.—T. L. 233, —, —, 237, 238, 225, 221; W. 103, 107, 103, 105, 100, 103, 103; T. 96, —, —, 105, 100, 95, 98; Ts. 25, —, —, —, —, —, —; B. f. g. 30' —, —, 31, 30, 34, 29 mm.

Females.—T. L. 225, —, —, 230; W. 101, 105, 102, 102; T. 95, —, —, 95; Ts. 25, —, —, —; B. f. g. 29, —, —, 32 mm.

Four males and three females have the tail entirely black. Three males have a thin whitish bar on the inner web of the outer tail-feathers and the remaining male is assymetrical, on one side of the tail the two outer feathers being marked with white and on the other side the outer feather only.

Birds from Sarawak are similarly variable; many have the tail entirely black.

No form *Cymborhynchus* is known from the Philippines.

PITTIDAE

96. Pitta venusta ussheri Sharpe.

5 ♂, 3 ♀ Samawang River and Bettotan.

"Iris dark; bill black; feet plumbeous or grey."

Males.—T. L. 175, 170, 180, 178, 183; W. 92, 91, 91, 91, 88; T. 35, 35, 36, 37, 33; Ts. 39, 39, 39, 40, 39; B. f. g. 28, 25, 26, 28 mm.

Females.—T. L. 174, 177, 178; W. 88, 92, 94; T. 36, 36, 36; Ts. 40, 40, 40; B. f. g. 27, 27, 26 mm.

The sexes of this *Pitta* seem exactly alike in plumage and variation is chiefly in the amount of purplish bronze on the throat and breast. The description of the species given in the Cat. Birds is not good. The crown is deep velvety black but the throat is much duller: the upper parts are brighter than the description indicates, the mantle being almost deep purple passing into blue on the rump and tail. The wings also are more blue than black and the species is distinguished from *venusta* by its darker crown, more brightly coloured upperparts and glossy breast.

All the Malaysian black-and-scarlet Pittas may be forms of *granatina*, but we need to know more of the ranges of *vanheurni* and *venusta* in Sumatra and of *granatina* and *ussheri* in North Borneo before definitely linking up the black with the red-crowned sections. In both islands they seem essentially lowland birds, although in Sumatra Jacobson obtained *venusta* up to a height of 1,400 metres.

In Borneo the dividing line between *granatina* and *ussheri* on the north-west side is between the Baram and Lawas Rivers: *granatina* occurs along the course of the former and *ussheri* on the latter, but perhaps both birds are found together in Brunei. On the east we have seen *ussheri* from the Anglo-Dutch boundary.

This species is not represented in the Philippines.

97. **Pitta baudi** Müll and Schl.

10 ♂, 9 ♀ Bettotan.

"Iris dark; bill black; feet fleshy or brownish-fleshy."

Males.—T. L. 188, 187, 186, 190, 193, 184, 186, 182, 178, 180; W. 92, 92, 93, 96, 95, 95, 90, 93, 91, 92; T 41, 41, 41, 42, 45, 41, 41, 41, 42, 40; Ts. 38, 40, 38, 40, —, 39, 39, 39, 37, 38; B. f. g. 26, 28, 26, 28, 28, 25, 26, 26, 26, 26 mm.

Females.—T. L. 176, 176, 187, 180, 189, 183, 179, 177, 188, W. 88, 92, 96, 93, 90, 91, 91, 92, 90; T. 40, 41, 41, 43, 43, 39, 44, 39, 40; Ts. 38, 40, 38, 37, 37, 37, 36, 37, 36; B. f. g. 26, 25.5, 26, 26, 26, 26, 24, 26, 27 mm.

In the male of this species four or five of the outer secondaries are conspicuously edged with white (buffy-white in the female), an important character not shewn in the two birds figured by Elliot in his Monograph, nor mentioned by Sclater in the description in the Cat. Birds although it is correctly depicted in the plate given by Müller and Schlegel.* In Elliot's plate some misplaced feathers are also represented as forming a well-marked bar across the upper tail-coverts, a feature not obvious in well-made skins.

The males of our series are very constant, but the females less so: some of the latter exhibit an irregular rosy flush on the underparts and others have the breast marked with irregular black bars or spots.

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*Verh. Nat. Ges. Ned. Ind. Zool., 1839-44, Aves., tab. II.

One bird sexed in the field as a male only differs from the females in that the bar on the wing-coverts is brownish-buff instead of white.

Not represented in the Philippines.

98. **Pitta sordida muelleri** Bp.

1 ♂ Samawang River.

"Iris dark; bill black; feet dark grey, tarsi brown."

T. L. 180; W. 112; T. 37; Ts. 40; B. f. g. 25 mm.

In size this specimen resembles three males from western Sarawak, but it differs in having more black on the abdomen and in having the thighs brownish green instead of blackish: in these respects it appears to approach *P. sordida sordida* of the Philippines, but is larger.

The present form is found in the island of Sibutu but in Balabac and Palawan typical *sordida* occurs.

99. **Pitta arcuata** Gould.

1 ♂ (imm.) Rayoh.

"Bill black; feet blue."

T. L. 172; W. 86; T. 38; B. f. g. 28 mm.

We now have this Pitta from the lowlands of Saribas and Samarahan and from 3,500′ on Mt. Penrissen, all places in Southern Sarawak. It also occurs at Lawas and on the lower slopes of Kina Balu.

Within Malaysian limits *P. arcuata* is found only in Borneo.

In the Catalogue of Birds Sclater has placed it with the *venusta-grantina* group on account of its blue superciliaries but we think it is an outlying westerly form of the *erythrogastra-mackloti* group of which *P. e. erythrogastra* occurs in the Calamianes, Palawan and Sibutu, while *P. e. propinqua*, originally from Balabac, also reaches Palawan. But the differences between these latter forms and *arcuata* is great enough to cause hesitation in placing them all under one specific name.

100. **Pitta cærulea hosei** Baker.

Pitta cærulea hosei Baker, Bull. B. O. C., xxxix, 1918, p. 20 (Mt. Dulit, Sarawak).

2 ♂, 1 ♀ Bettotan.

"Iris dark; bill black; feet dark grey, fleshy plumbeous or dull pinkish fleshy."

Males.—T. L. 273, 277; W. 149, 145; T. 63, 59; Ts. 58. 58; B. f. g. 43, 42 mm.

Female.—T. L. 275; W. 147; T. 58; Ts. 55; B. f. g. 43 mm.

We have no Sumatran topotypes of *cærulea* but the only difference we can perceive between these males and two from Peninsular Siam is that they have more black on the forehead and are perhaps very slightly less brown and more grey below: in the first of these characters the continental bird resembles the plates of Sumatran males given by Temminck (Pl. Col. 217) and Elliot (Mon. Pittidæ).

The Bornean female is slightly richer brown on the underparts, crown and hind neck than one from Peninsular Siam and, as Baker stated, the black on the crown consists of black edging to the feathers instead of black bars. The female figured by Elliot is much deeper brown below than either of the females before us.

No Philippine form.

101. **Eucichla guajana schwaneri** (Bp.).

1 ♀ Rayoh.

"Iris dark brown; bill black; feet grey."

T. L. 210; W. 107; T. 67; Ts. 42; B. f. g. 29 mm.

For the use of the name *guajana* see Kloss, Journ. Malayan Branch, Roy. As. Soc., iv, 1926, p. 161.

No Philippine form.

HIRUNDINIDAE

102. **Hirundo rustica gutturalis** Scop.

1 ♂ Kudat.

Wing 113 mm.

Occurs in Palawan.

103. **Hirundo javanica abbotti** (Oberh.).

Hypurolepsis javanica abbotti Oberh., Bull. U. S. Nat. Mus., 1917, p. 33 (Anamba Islands, South China Sea).

2 ♂, 3 ♀ Kudat (also 5 immature birds).

"Iris dark; bill and feet black."

Males.—T. L. 134, 136; W. 105, 104; T. 46, 45; Ts. 10, 10; B. f. g. 16.5, 16.5 mm.

Females.—T. L. 131, 137, 135; W. 107, 106, 105; T. 48, 47, 47; Ts. 9.5, 10, 10.5; B. f. g. 16.5, 16.5, 16 mm.

There is much individual variation in this series but, excluding immature birds, sex for sex the Kudat birds are rather darker, or deeper chestnut, on the throat than typical *javanica*, the difference being more marked in males than females. Because of this and on account of their longish wings, we place them with ***abbotti*** of the Anamba Island's, from which we consider Malayan birds are inseparable (*vide* Journ. Malayan Branch, Roy. Asiat. Soc., vi, 1928, p. 55).

H. j. abbotti occurs in Palawan and Sibutu.

MUSCICAPIDAE

104. Cyornis unicolor infuscata Hartert.

Cyornis unicolor infuscata (Blyth) Hartert, Nov. Zool., ix, 1902, p. 550 (Java).

1 ♂ (juv.) Bettotan.

"Iris dark; bill black; feet plumbeous."

Crown, wing-coverts and mantle blackish boldly spotted with buff: wings washed with blue; tail blue; underparts buff, narrow black edgings to the feathers producing a squamated appearance. A few entirely blue feathers showing through on mantle and back.

Robinson and Kinnear have recently named this bird *C. u. harterti* (Nov. Zool., xxxiv, 1928, p 256), but we do not see any reason to abandon the argument of Robinson and Kloss as to the validity of the name inadvertently given it by Hartert (c. f. Journ. Fed. Malay States Mus., vii, Part 2, 1918, p. 155). It is true that Hartert believed, erroneously as is now known, that he was using a name given to the Malaysian bird by Blyth: but he described it and differentiated it from the typical form, selected a type locality, gave the habitat and cited a specimen within it: all under a combination hitherto unused by Blyth or anybody else, ***Cyornis infuscata***: though he was not deliberately proposing a new form he has actually described and named one.

No Philippine representative.

105. Cyornis cærulata cærulata (Bp.).

Schwaneria cærulata Bp., Rev. et. Mag. de Zool. (2), ix, 1857, p. 54 (Sambarajan, South Borneo).

Cyornis [*banyumas*] *cærulata* Stresem. (pt.), Ornith. Monatsb., xxxiii, 1925, p. 47.

Cyornis cærulata Rob. and Kinn., Nov. Zool., xxxiv, 1928, p. 253.

Cyornis cærulata cærulata Chas. and Kloss, Bull. Raffles Mus., 2, 1929, p. 31.

7 ♂ (2 juv.), 5 ♀ Bettotan and Rayoh.

"Iris dark; bill black; feet fleshy, pinkish grey or bluish-flesh."

Males.—T. L. 157, 148, 147, 146, 155; W. 70, 76, 71, 76, 74; T. 59, 62, 56, 53, 56; Ts. 17, 17, 18, 16.5,—; B. f. g. 21.5, 21, 20, 21, 20 mm.

Females.—T. L. 140, 147, 117, 144, 145; W. 69, 72, 70, 71, 74; T. 49, 53,—, 52, 55; Ts. 17, 17, 17, 18, 17; B. f. g. 19, 20, 20, 19, 20 mm.

Two slightly differentiated races of *cærulata* occur in Borneo, an eastern and a western one. The type of *cærulata* came from South Borneo and, by analogy, Eastern birds are probably like it. We have examined specimens from the Kutei district of Middle East Borneo and they are like those before us from North Borneo.

In Sarawak, and perhaps in western Dutch Borneo, occurs a race in which the male is more deeply coloured below and in which the female has a tendency to develop more blue above, the scapulars and wing-coverts being slightly tinged with that colour. This western race is *C. c rufifrons* Wallace.

C. cærulata seems to have no Philippine representative. in *C. lemprieri* the female has a brown tail and on description it seems nearest to *C banyumas.*

106. Cyornis rufigastra rufigastra (Raffles).

Cyornis rufigastra rufigastra Stresem., Ornith. Monatsb. xxxiii, 1925, p. 49; Chasen and Kloss, Bull. Raffles Mus., 2, 1929, p. 36.

Cyornis beccariana beccariana Rob. and Kinn., Nov. Zool., xxxiv, 1928, p. 245.

2 ♂, 5 ♀, 2 juv. Samawang River, Bengkoka River, Kudat and Benoni;

1 ♂, 1 ♀ Banguey Island;

1 ♂, 1 ♀ Balambangan Island;

1 ♀ Mallewallé Island.

"Iris dark; bill black; feet brownish black, grey or brownish leaden."

Males.—T. L. 155, 155, 164, 160; W. 73, 75, 80, 78; T. 61, 61, 69, 65; Ts. 19, 18, 18, 18.5; B. f. g. 19, 19, 19, 20 mm.

Females.—T. L. 145, 143, 159, 152, —, 155, 153, 155; W. 68, 69, 75, 72, —, 71, 74, 73, 77; T. 55, 56, 63, 60, —, 64, 60, 64; Ts. 16, 19, 19, 18, —, 16.5, 18, 18; B. f. g. 18, 19, 19, 19.5, —, 19, 19, 19 mm.

A series very variable in both sexes, but not separable from an equal series from the Malay Peninsula.

This species occurs in Palawan as a very slightly altered form, *litoralis.* Sibutu is inhabited by *philippensis* which is more differentiated but clearly only a subspecies of *rufigastra.*

107. **Cyornis turcosa rupatensis** Oberh.

Cyornis elegans rupatensis Oberh., Proc. Biol. Soc. Wash., xxxiii, 1920, p. 87.

Cyornis elegans Stresem. (pt.), Ornith Monatsb., xxxiii, 1925, p. 53.

Cyornis turcosa Rob. and Kinn., Nov. Zool., xxxiv, 1928, p. 236.

Cyornis turcosa rupatensis Chas and Kloss, Bull. Raffles Mus., 2, 1929, p. 39.

3 ♂, 4 ♀ Rayoh.

"Iris brown; bill black; feet grey."

Males.—T. L. 154, 150, 150; W. 76, 77, 76; T. 61, 61, 63, B. f. g. 20, 20, 19 mm.

Females.—T. L. 155, 150, 150, 153; W. 73, 71, 70, 73; T. 58, 55, 54, 56; B. f. g. 20, 19, 18, 20 mm.

Exactly like specimens from Sarawak and the Malay Peninsula, thus agreeing with the western race and not with the typical form from S. E. Borneo.

C. turcosa does not occur in the Philippines.

108. **Cyornis superba** Stresem.

Cyornis superba Stresem., Ornith. Monatsb., xxxiii, 1925, p. 52: Sarawak.

Cyornis beccariana auct. (nec. Salvadori).

2 ♂, 2 ♀ Samawang River and Bettotan.

"Iris dark; bill black; feet plumbeous (♂), pinkish plumbeous or fleshy (♀)."

Males.—T. L. 157, 148; W. 76, 73; T. 66, 62; Ts. 15.5, 17; B. f. g. 19, 20 mm.

Females.—T. L. 148, 143; W 70, 69; T. 58, 55; Ts. 15, 15.5; B. f. g. 20, 18 mm.

C. superba does not occur in the Philippines.

109. **Muscitrea grisola** subsp

2 ♂ Kudat; 6 ♂, 7 ♀ Banguey Id.; 3 ♂ Balambangan Id.

(ad.) "Iris dark; bill black; feet plumbeous."

(imm.) "Maxilla blackish edged with yellowish; mandible dull yellow."

Males.—T. L. 155, 158, 165, 160, 160, 162, 160, 164, 167, 163, 170; W. 83, 84, 85, 83, 87, 84, 82, 84, 88, 86, 88; T. 64, 63, 66, 63, 66, 68, 66, 66, 66, 65, 70; Ts. 19, 19.5, 19, 19.5, 19.5, 19.5, 19, 19, 19, 20.5, 21; B. f. g. 19, 19, 21, 19.5, 18.5, 19.5, 19, 19, 20, 19, 21 mm.

Females.—T. L. 162, 160, 158, 157, 163, 162, 162; W. 80, 79, 84, 81, 83, 82; T. 18, 18, 18, 19, 20, 19, 20; B. f. g. 19.5, 18.5, 19.5. 19, 20, 19, 19 mm.

We have seventy skins of this species before us from various localities in Malaysia and they are so variable that it seems impossible to deal with them subspecifically. It has already been pointed out* that northern birds are rather larger than southern examples. Excluding birds with traces of rufescent on the wing-quills, all of which we consider not fully adult, our material is readily divisible into two series; for birds from the North Natuna Islands, North Borneo, Banguey and Balambangan Islands can be picked out at once by their darker upperparts and especially by their greyer and darker throats and breasts. But these latter are fresher skins than the remainder of our material and were furthermore all collected in September when the fresh newly-moulted plumage is being worn. Almost all our pale birds were taken in the first half of the year and many are obviously very worn; but a few from such widely scattered localities as the Redang Islands (E. coast, Malay Peninsula), Pulau Mohea, W. coast, Peninsular Siam, and Siberut Island are also autumn moulted birds and these approach our North Borneo and Natuna birds in being darker above although less grey below.

We incline to the belief that this is a very variable bird, doubtfully separable except perhaps on size as indicated above; that through the year a rather unusually large amount of "bleaching" takes place in the plumage and that museum specimens alter.

At the same time we admit that the material in front of us is exceptionally variable if it all belongs to one race.

Stresemann has separated the birds of Sirhassen Island, South Natuna Islands, as *P. g. secedens*† but he found two examples from N. W. Borneo and another from Lombok very like them. Hartert says that a bird from the Redang Islands, is like the type of *secedens*, but our Redang Island series, to which the Tring specimen once belonged, is certainly not separable from other Malayan material. These statements support our opinion as to individual variability. It may, however, be possible to recognise three races:—one (*grisola*) for the large continental bird, a second for the birds of Borneo and the Natuna Islands (*secedens* Stresem.) and a third for those of the Malay States, Sumatra and Java, etc. (*butaloides* Bartels and Stresem.) if different from the birds of the West Sumatran Islands (*vandepolli* and *nesiotes*) which we have not seen.

Hyloterpe whiteheadi of Palawan is a form of this species.

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*Rob. and Kloss, Journ. Nat. Hist. Soc. Siam, v, 1924, p. 233.
†Nov. Zool., xx, 1913, p. 355.

110. **Oreicola* dumetoria muelleri** (Blyth).

Siphia clopurensis Sharpe, Ibis, 1890, p. 206 (Sandakan, ♀).

4 ♂ ad. 2 ♂ imm. Bettotan.

1 ♂ subad. Samawang River.

♂. "Iris dark; bill black; feet fleshy grey."

Males, ad. and subad.—T. L. 121, 120, 117, 117, 115; W. 62, 60, 62, 59, 58; T. 45, 43, 46, 41, 43; Ts. 17.5, 17, 17, 16, 18.5; B. f. g. 16.5, 14.5, 16.5, 16, 17 mm.

Males, imm.—T. L. 115, 115; W. 59, 58; T. 41; Ts. 18.5, 17; B. f. g. 14.5, 15 mm.

The adult and subadult birds have the postocular white stripe and the pale patches on the tail feathers well developed. The subadult bird and another male in the same stage from the Isthmus of Kra, show the remains of their juvenile plumage in a partial wash of brown on the mantle and wings. The immature males differ only from females in having pale buffy bases to the tail, and the wings and coverts fulvous where in the adult males these are white. Faint indications of a postocular stripe are present. The feet are fleshy white.

"The adult female" described by Büttikofer (Notes Leyden Mus. xxi, 1900, p. 191) is evidently an immature male in a rather more advanced plumage than our specimens ("tail black with white bases to all but the innermost feathers").

These Bornean birds agree with a Malayan series and we list them under Blyth's name though Robinson and Kloss have noted of the only Sumatran male they had seen that it showed no trace of a postocular white stripe.†

Not represented in the Philippines.

111. **Hypothymis azurea prophata** Oberh.

11 ♂, 4 ♀ Samawang River and Rayoh;

4 ♂, 5 ♀ Banguey Island;

3 ♂ Balambangan Island.

♂. "Iris dark; bill blue, tip black; feet dark blue."

♀. "Bill blackish."

Males (Mainland).—T. L. 155, 158, 162, 163, 155, 160, 162, 158, 162, 160, 155; W. 68, 70, 71, 71, 70, 71, 72, 68, 71, 67, 72; T. 70, 70, 72, 75, 71, 67, 75, 71, 74, 70, 73; Ts. 16, 16, 17, 16, 15.5, 17, 15.5, 16.5, 16, 16, 16; B. f. g. 18, 19, 18, 20, 19, 19, 19, 19.5, 19, 17.5, 18.5 mm.

**Erythromyias* Sharpe and Auct.

†Journ. Fed Malay States Mus., xi, 1924, p 271.

Males (Islands: Banguey first).—T. L. 163, 165, 170, 159, 166, 162, 171; W. 70, 72, 73, 72, 75, 72, 75; T. 74, 74, 79, 73, 78, 73, 77; Ts. 16, 16, 15.5, 16, 16.5, 17, 16.5; B. f. g. 19, 18, 18.5, 18, 18, 18, 19.5 mm.

Females (Mainland).—T. L. 143, 152, 150, 153; W. 66, 68, 68, 70; T. 66, 68, 70, 75; Ts. 16, 16, 17, 16; B. f. g. 18, 17, —, 16 mm.

Females (Banguey).—T. L. 156, 160, 162, 154, 160; W. 67, 70, 71, 69; T. 72, 78, 76, 66, 72; Ts. 16, 16, 16.5, 15, 16; B. f. g. 18, 17, 18, 18, 18 mm.

Great care is necessary in comparing females of this species for newly collected specimens are darker on the upperparts than older skins. Skins collected in the Malay Peninsula as late as 1924 are noticeably paler and browner on the mantle and back than the birds listed above, but fresher material shows that birds from North Borneo, Sarawak and the Malay Peninsula are inseparable.

This species occurs in Palawan and Sibutu as *H. a. azurea.*

112. **Rhipidura perlata** S. Mull.

4 ♂ Samawang River; 6 ♂, 3 ♀ Bettotan and Rayoh.

"Iris dark; bill black; feet black, plumbeous black, or brownish grey."

Males.—T. L. 182, 170, 174, 175, 175, 180, 180, 173, 187, 172, W. 84, 76, 76, 81, 84, 86, 85, 82, 86, 80; T. 86, 80, 80, 82, 85, 89, 85, 83, 90, 88; Ts. 10, 15, 15, 14, 16, 14, 15, 14, 15, 15; B. f. g. 18, 10, 16, 17, 18, 16, 19, 15, 19, 19 mm.

Females.—T. L. 172, 170, 168; W. 76, 80, 80; T. 80, 80, 80; Ts. 15, 15.5, 15; B. f. g. 16.5, 17, 17 mm.

No Philippine representative.

113. **Rhipidura javanica longicauda** Wallace.

Rhipidura longicauda Wall., P. Z. S., 1865, p. 476 (Sumatra).

5 ♂, 4 ♀ Samawang River, Kudat, Benoni and Rayoh;

1 ♂, 1 ♀ Banguey Island;

2 ♂ Balambangan Island.

"Iris dark; maxilla black; mandible black, pale at base; feet black."

Males (Mainland).—T. L. 178, 182, 180, 188, —; W. 81, 78, 79, 80, 81; T. 91, 92, 90, 95, —; Ts. 20, 20, 19, 18, —; B. f. g. 18.5, 17.5, 18, 18, — mm.

Females (Mainland).—T. L. 180, 172, 175, —; W. 76, 71, 74, 74; T. 90, 84, 85, —; Ts. 18, 18, 20, —; B. f. g. 16, 16, 17, — mm.

Males. (Islands: Banguey bird first).—T. L. 188, 176, 180; W. 83, 81, 81; T. 96, 90, 90; Ts. 20, 20.5, 20; B. f. g. 17, 17, 18 mm.

Female. (*Banguey*).—T. L. 185; W. 75; T. 90; Ts. 20; B. f. g. 18 mm.

Although the two forms are not very well defined it is perhaps advisable to restrict *javanica* to Java as continental birds, together with those from Borneo and Sumatra seem rather larger, while specimens from these localities are, on a series, generally duller on the upperparts, less reddish brown on the rump and upper tail-coverts and less washed with brownish on the abdomen. The wing-range of our Javan males is 75 - 77 mm., but birds from Borneo and the Malay Peninsula reach 83 mm. and those from Sumatra 85 mm.

We have not seen *R nigritorquis* of Palawan but on description can see no reason why it should not be considered a form of *R javanica*.

114. **Terpsiphone paradisi borneensis** (Hartert).

Tchitrea paradisi borneensis Hartert, Bull. B. O. C., xxxvi, 1916, p. 75 (Sarawak); Rob. and Kloss, Ibis. 1918, p 590.

Terpsiphone paradisi borneensis Chas. and Kloss, Journ Malayan Branch Roy. Asiat. Soc., vi, 1928, p. 67.

11 ♂ ad., 5 ♂ imm., 8 ♀ Samawang River, Bettotan and Rayoh.

"Iris dark; eyelid blue; bill blue, edges and tip black; feet blue."

Adult males (*white plumage*).—T. L. 235, 348, 455, 260, 337, 340, 310, 323, 483, 380, 295; W. 92, 92, 97, 93, 97, 97, 92, 92, 96, 96, 96; T. 118, 226, 335, 142, 215. 218, 190, 212, 363, 260, 180; Ts. 18, 18, 16, 18, 17.5, 16.5, —, 16, 17, 17, 20; B. f. g. 28, 29, 28, 29, 29, 30, 30, 28, 30, 30, 29 mm.

Immature males (*brown or changing plumage*).—T. L. 220, 217, 212, 215, 219; W. 90, 89, 89, 88, 93; T. 106, 108, 105, 100, 110, Ts. 19, 17, 17.5, 17.5, —; B. f. g. 28, 25, 28, 28, 29 mm.

Females.—T. L. 222, 218, 228, 207, 210, 227; W. 90, 91, 90, 87, 86, 91; T. 107, 105, 118, 95, 96, 113; Ts. 16, 15, 15, 18, 17, 17; B. f. g. 27, 26, 27, 27, 24, 27 mm.

The birds listed above as adult males are in the white plumage. They are very variable in the amount of black on the upperparts, but are separable from a large series of *T. p. affinis* from the Malay Peninsula by their long tails and large bills. We cannot see that there is any difference in the metallic blue colour of the head in the two forms and the colour of the shaft of the two lengthened rectrices is evidently a variable feature and cannot be used as a racial character although it can perhaps be said that, as a series, Bornean birds have the shaft more constantly black than birds from the mainland.

In addition to the skins before us we have examined a fair number of specimens from Sarawak. The longest tails of these measure 341, 350, 363, 372, 392, 407 and 448 mm. and it is clear that the bird with a tail of 459 mm. mentioned by Hartert (l. c. s.) must be regarded as exceptional.

Adult females from Borneo vary chiefly in the amount of the rufous wash on the abdomen and under tail-coverts. They are cinnamon above, have the abdomen strongly washed with rufous-buff and have the throat and breast grey: in *affinis* the upperparts are chestnut, the abdomen is whitish and the grey of the underparts extends posteriorly over the flanks thereby restricting the pale area of the abdomen.

Young males, before they commence to change, are exactly like *some* females, the latter perhaps not fully adult. Two of our young males from Bettotan are changing from the brown plumage (rather yellower and less chestnut than that of the fully adult female). One has only one white feather (a secondary) in the middle of the wing. The other has the whole of the head and throat metallic black as in the white-plumaged male, the mantle and back brown with a few scattered white feathers, breast grey, abdomen and under tail-coverts mixed white and rufous: marginal and lesser coverts white, median coverts brown, major coverts white; outer primaries brown, inner primaries white; outer secondaries brown, inner secondaries white, tail brown except for two new white rectrices appearing in the centre. We have seen another bird from Sarawak in this most interesting stage. The brown plumage was represented by the bastard wing, four outer primaries, some of the long secondaries and one or two feathers of the mantle, otherwise the bird (which had the rectrices in sheath at the base) was in the white phase. Witherby has recorded a specimen of *T. incei* in which the white plumage was apparently being assumed in one moult from the rufous stage, but it is curious that none of our long series of continental birds are in the change and we have seen far more of them than we have of Bornean birds.

Birds from Sarawak and North Borneo are alike. It seems not to be generally known that the edges of the eyelids of *T. affinis* and *T. borneensis* are much swollen and fleshy in life: they are also bright blue in colour and judging from the figure of *Callæops periophthalmica* (Nov. Zool., xxiii, 1916, pl. 1) the eyelids of this bird are exactly similar and therefore not especially remarkable.

There is a doubtful record of "*T. paradisi*" from Luzon in which we do not believe: otherwise this species is not known from the Philippines. *T. nigra* (? *Callæops periophthalmica*) seems to be a form of *T. atrocaudata*.

115. Drymophila pyrrhoptera pyrrhoptera (Temm.).

Philentoma saravacense Bartlett, Sarawak Note-book, pt. ix, 1896, p. 80 (Sarawak).

Philentoma maxwelli Bartlett, Journ. Str. Br. Roy. As. Soc., 28, 1895, p. 96 (Sarawak).

4 ♂, 3 ♀ Bettotan and Rayoh.

"Iris red; bill black or brown; feet plumbeous."

Males.—T. L. 168, 170, 170, 165; W. 81, 79, 79, 82; T. 70, 67, 68, 71; Ts. 16, 18, 17, 19; B. f. g. 20, 23, 18, 24 mm.

Females.—T. L. 168, 172, 165; W. 78, 78, 75; T. 68, 70, 65; Ts. 14.5, 16, 17; B. f. g. 23, 22, 22 mm.

One male is in the blue phase described by Bartlett as *saravacense* and one of the females is browner on the throat and breast than any of our large series from Borneo, Sumatra and the Malay Peninsula. Kloss has discussed the various synonyms of this bird in Journ. F. M. S. Mus., x, 1921, p. 218.

No Philippine representative.

116. Rhinomyias umbratilis umbratilis (Strickl.).

4 ♂, 3 ♀ Bettotan and Rayoh.

"Iris dark; bill black; feet greyish-flesh."

Males.—T. L. 155, 155, 155, 157; W. 78, 79, 78, 78; T. 65, 65, 68, 69; Ts. 16; B. f. g. 24, 21, 22, 21 mm.

Females.—T. L. 156, 140, 156; W. 75, —, 76; T. 61, 62, 65; Ts. 16, 16, 16; B. f. g. 19, —, 21 mm.

R. ruficrissa Sharpe is a distinct species, perhaps a submontane or mountain bird, occurring very close to *R. umbratilis* if not actually side by side with it. Excluding *R. brunneata* (syn. *tardus*, *nicobarica*) which occurs in the Malay Peninsula as a winter migrant the Malaysian species of *Rhinomyias* may be arranged as follows.—

I. A pale post-ocular stripe ... ... *gularis.**
II. No post-ocular stripe ... ...
    A. Breast buffy-brown; lores pale greyish; throat white but not contrasting sharply with the breast ... ... *olivacea.*
    B. Breast brownish-grey, or olive-grey; lores pale greyish; throat clear white contrasting sharply with the breast ... ... *umbratilis.*

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*Our material is very poor at present, but we doubt if this bird is correctly placed in *Rhinomyias*.

C. Breast greyish; lores dark; throat
dull white not contrasting sharply
ly with the breast ... ... *ruficrissa*.

No form of *umbratilis* is known from Java and Stresemann has recently shown that *baliensis* Hartert, goes with *olivacea* and is not a form of *umbratilis* (*pectoralis* auct.) as was supposed.[*]

R. olivacea occurs in the Malay Peninsula, Sumatra, Borneo, Bali and Java, and we can recognise no subspecies from those areas. Only the bird from the North Bornean Islands seem separable.

R. umbratilis occurs in the Malay Peninsula (syn. *albo-olivacea* Hume), Sumatra (syn. *infuscata* Blyth[†]) and Borneo (syn. *pectoralis* Salvad.).

R. ruficrissa is restricted to Borneo.

R. richmondi Stone, and *R. eclipsis* Oberh., are names that have been applied to West Sumatran Island forms of which we have no knowledge; but since Stone determined as *richmondi* birds from islands both west and east of Sumatra it seems improbable that they differ from the Sumatran bird itself.

No *Rhinomyias* is known from Palawan or Sibutu.

117. **Rhinomyias olivacea perolivacea** Chas. and Kloss.

Rhinomyias olivacea perolivacea Chasen and Kloss, Journ. für Ornith., 1929, Band 2, p. 113.

Like *R. o. olivacea* of the Malay Peninsula but the upper parts rather greener, the tail less rufous and the breast paler.

Type. ♂ ad. Balambangan Island, North Borneo, 11th September, 1927.

7 ♂, 1 ♀, 2 imm. ex. Banguey and Balambangan Islands.

"Iris dark; bill black; feet brownish fleshy."

Males.—T. L. 153, 145, 152, 147, 148, 152, 150; W. 75, 74, 74, 74, 76, 74, 74; T. 62, 59, 63, 57, 64, 61, 60; Ts. 18, 18, 17, 17.5, 17, 18, 18; B. f. g. 20, 18, 19, 19, 19.5, 19.5, 18.5 mm. (The measurements of the type are given first, and those of the Banguey bird last.)

Female.—T. L. 147; W. 75; T. 59; Ts. 16.5; B. f. g. 19 mm.

Birds from the Malay Peninsula, Sumatra, Borneo and Java seem to be inseparable, but we have not seen specimens from the mainland of North Borneo which may be occupied by *R. o. perolivacea*.

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[*] *Vide* Orn. Monats. xxxvi, 1928, p. 105, where Stresemann considered West Javan birds to be distinct, *i.e.*, *baliensis*: but later in Treubia xi, 1929, p. 122, he agrees that they are not separable from typical continental *olivacea*.

[†] *Vide* Robinson and Kloss, Journ. Fed. Malay States Mus., viii, pt. II, 1923, p. 360.

R. o. perolivacea is not a well-marked race. It differs from the typical form chiefly in its less rufous tail, a character on which we should not have placed much reliance without fresh skins of *R. o. olivacea* before us.

118. Culicicapa ceylonensis ceylonensis (Swains.).

1 ♀, 1 unsex. ex. Bettotan.

"Iris dark; maxilla black; mandible black, base fleshy; feet ochreous, tarsi brown."

T. L. 128, 123; W. 60, 63; T. 49, 50; Ts. 13, 15; B. f. g. 13, 15 mm.

We have already given our reasons* for considering that birds from the whole of Malaysia are inseparable from typical *ceylonensis* of Ceylon.

C. c. ceylonensis also occurs in Palawan.

119. Stoporala thalassina thalassoides (Cab.).

1 ♂ Bettotan

"Iris dark; bill and feet black."

T. L. 144; W. 75; T. 64; Ts. 15.5; B. f. g. 15 mm.

Not known from Palawan or Sibutu.

CAMPEPHAGIDAE

120. Coracina sumatrensis sumatrensis (S. Müll.).

1 ♂, 4 ♀ Banguey Island.

"Iris pale yellow; bill and feet black."

Male.—T. L. 284; W. 152; T. 120; Ts. 25; B. f. g. 47 mm.

Females.—T. L. 268, 278, 260, 266; W. 151, 149, 147, 146; T. 110, 118, 100, 110; Ts. 24, 27, 23, 24; B. f. g. 36, 38, 35, 37 mm.

We cannot separate these birds from a series of *sumatrensis* from the southern part of the Malay Peninsula which are no larger than some topotypical males having a wing-range of 150 - 159 mm. The type of *messeris* Oberh.,† from Trang, Peninsular Siam, seems to be the most northerly specimen on record (wing 158 mm.). Oberholser's type of *nesiarchus*‡ from Pulau Parit, near Singapore, measures 160 mm. and we have another bird from the near-by island of Gallang with a wing of 164 mm., but it is difficult to believe that there is a distinct large race in the Rhio Archipelago.

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*Journ. F. M. S. Mus., xiii, 1927, p. 279.

†Journ. Wash. Acad. Sci., 16, 1926, p. 517 (Trang, Malay Peninsula, lat. 7° 30′ N.).

‡l. c. s.

The Indo-Chinese and Malayan forms of *Coracina* can be grouped into three species:—*C. personata* from Timor of which the small dark *larvatus* (Java), *normani* (Borneo) and *melanocephalus* (Sumatra) are western island forms. The species does not reach the continent.

C. sumatrensis is purely a Malaysian bird but seems to be unrepresented in Java, though it may be noted that Hartert treats the Kangean Island *Coracina* as a form of *sumatrensis* (Nov. Zool., xxix, 1922, p. 372). It is found in the lowlands of Sumatra, the Malay Peninsula and Borneo; and a number of small islands in the area have their peculiar forms.

C. javensis (Java) only occurs in the Malay Peninsula as a mountain bird (*viz.*, *C. j. larutensis* Sharpe*); *C. j. siamensis* Baker, of Indo-China merely differs in being generally paler than the last with the dark spectacles less distinct or obsolete (specimens from S. W. Siam to S. Annam examined*). There are island races in Hainan and Formosa and races (*macei* section) to the west in India, etc.

Occurs in Balabac and Palawan as *difficilis*, *guillemardi* Salvad., belongs to another species.

121. **Lalage fimbriata culminata** (A. Hay).

7 ♂ ad., 4 ♂ imm., 7 ♀ ad., 2 ♀ imm. Bettotan.

"Iris brown; bill and feet black."

Adult males.—T. L. 182, 181, 182, 187, 192, 185, 177; W. 97, 94, 91, 96, 97, 94, 92; T. 82, 78, 73, 77, 83, 78, 73; Ts. 19, 19, 19, 21, —, 19, 17.5; B. f. g. 22, 22, 21.5, 21, 23, 20, 22 mm.

Adult females.—T. L. 187, 191, 185, 185, 190, 191, 179; W. 91, 95, 96, 96, 95, 93, 94; T. 75, 76, 80, 78, 83, 82, 74; Ts. 19, 20, 22, 20, 18, —, 20; B. f. g. 22, 22, 23, 23, 23, 23, 22.5 mm.

The males are rather variable, some, perhaps younger birds, being rather paler and less blackened than others.

Considerable material shows that there are no colour differences between birds of the South Malay Peninsula and Sumatra (*culminata* Hay) and those of Borneo (*schierbrandi* Pelzeln, and *borneensis* Salvad.) as Kloss once perceived on smaller series.† The wings of Bornean birds measure 87 - 97 mm., of the others 91 - 100 mm. This difference is too slight to maintain a Bornean form on size alone.

The species is not known from Palawan or Sibutu.

**Vide* Robinson and Kloss, Journ. Nat. Hist. Soc. Siam, v, 1924, p. 252

†Journ. Fed. Malay States Mus., x, 1921, p. 219.

122. Lalage nigra schisticeps Neumann.

Lalage nigra mitifica Bangs, Bull. Mus. Comp. Zool. Harvard, lxv, 1922, p. 80.

3 ♂, 1 ♀ Kudat; 2 ♂ Banguey Island; 1 ♂ imm., 1 ♀ Balambangan Island.

"Iris dark; bill and feet black."

Males (adult).—T. L. 180, 175, 182, —, 180; W. 94, 93, 93, 90, 92; T. 75, 75, 72, —, 74; Ts. 20, 20, 20.5, —, 19; B. f. g. 21.5, 21, 21, —, 21.5 mm.

Females.—T. L. 179, 188; W. 90, 91; T. 68, 78; Ts. 20, 20.5; B. f. g. 21, 21.5 mm.

(*The measurements of the island birds are given last*).

The female from Balambangan is scarcely so pure a grey above as that from the mainland but it is younger. The races and synonomy of this bird have been recently discussed by Kloss in Journ. Malayan Branch Roy. Asiat. Soc., iv, 1926, p. 158; v, 1927, p. 351.

Occurs in Palawan.

123. Pericrocotus flammeus xanthogaster (Raffles)

2 ♂ Bettotan.

"Iris dark; bill and feet black."

Adult ♂. T. L. 168; W. 82; T. 71; Ts. 16.5; B. f. g. 20 mm.

One of these males is immature and in yellow plumage: the other seems inseparable from topotypes of *xanthogaster* from Bencoolen, W. Sumatra.

No form of this species has yet been discovered in Palawan or Sibutu

PYCNONOTIDAE

124. Aegithina viridissima viridissima (Bp.).

6 ♂, 4 ♀ Kudat, Benoni and Rayoh; 2 ♂, 3 ♀ Banguey Island.

"Iris brown; bill plumbeous, culmen and tip black; feet plumbeous."

Males (*mainland*).—T. L. 130, 130, 132, 128, —, 135; W. 62, 61, 62, 60, 65, 61; T. 47, 45, 48, 42, 47, —; Ts. 18.5, 18, 17, 20, 17, —; B. f. g. 17.5, 19, 19, 18, 19, — mm.

Males (*Banguey*).—T. L. 130, 129; W. 61, 61; T. 48, 45; Ts. 17.5 18; B. f. g. 18, 18 mm.

Females (*mainland*).—T. L. 132, 135, 132; W. 62, 60, 63; T. 47, 46, 47; Ts. 17, 17, 17; B. f. g. 20, 18, 18 mm.

Females (*Banguey*).—T. L. 127, 132, 129; W. 59, 61, 60; T. 58, 48, 49; Ts. 18, 17, 17; B. f. g. 16, 18.5, 16.5 mm.

This species is not known from the Philippine.

125. **Aegithina tiphia viridis** (Bp.).

10 ♂, 4 ♀ Kudat and Rayoh; 7 ♂, 1 ♀ Banguey Island; 1 ♀ Balambangan Island.

"Iris grey or whitish; bill black, edges plumbeous; feet plumbeous."

Adult Males (*mainland*).—T. L. 134, 134, 134, 135, 135, 132, 134, 142; W. 62, 63, 62, 62, 62, 62, 64, 64; T. 48, 47, 46, 48, 48, 47, 49, 49; Ts. 21, 18, 18, 20, 19, 19, 19, 20; B. f. g. 19, 17, 19, 19, 20, 19, 19, 20 mm.

Adult Males (*islands*).—T. L. 144, 137, 153, 147, 142, 138, 147, 152; W. 63, 64, 62, 67, 63, 62, 64, 66; T. 48, 46, 55, 51, 46, 46, 52, 52; Ts. 18, 19, 20, 22, 19, 19, 20, 20; B. f. g. 18, 19, 20, 20, 20, 19, 20, 20 mm.

Females (*mainland*).—T. L. 133, 130, 137, 143, 142; W. 59, 63, 60, 60, 60; T. 50, 50, 49, 54, 50; Ts. 19, 19, 19.5, 20, 19; B. f. g. 19, 18, 18.5, 17. 20 mm.

Females (*islands*).—T. L. 143, 136, 141; W. 60, 60, 63; T. 45, 50, 46; Ts. 20, 19, 19; B. f. g. 19, 18.5 19 mm.

All the above birds, together with seven males from Labuan (wings 63 - 67 mm) seem to belong to one race. One or two of the males have a few black feathers in the mantle.

Oberholser has practically restricted *viridis* to the North of Borneo by naming the greener birds of the South. They are *A. t. damicra* Oberh. (syn. *zophonata* Oberh.)*

A. t. aequanimus Bangs, is the Palawan form.

126. **Chloropsis viridis zosterops** Vig.

Chloropsis viridis viriditectus Hartert, Nov. Zool., 1902, p. 212: Baram, Sarawak.

15 ♂, 13 ♀ Samawang River, Bettotan and Rayoh.

"Iris brown; maxilla black; mandible black (base grey in females); feet plumbeous."

Males.—217, 206, 199, 205, 198, 195, 215, 206, 215, 207, 200, 214, 192, 220, 217; W. 105, 102, 98, 100, 101, 100, 102, 103, 102, 106, 100, 102, 100, 102, 105; T. 81, 77, —, 78, —, 75, 77, 73, 80, 80, 75, 78, 72, 83, 85; Ts. 22, 22, —, 22, 22, —; B. f. g. 29, 28, —, 30, —, 27, 28, 28, 26, 27, 25, 29, 26, 27, 28 mm.

Females.—T. L. 202, 202, 200, 202, 197, 195, 198, 190, 198, 200, 204, 192, 191; W. 95, 97, 98, 94, 95, 95, 98, 96, 95, 98, 97, 93, 94; T. 77, 71, 75, 74, —, 72, 68, 72, 75, 73, 68, 70, 67; Ts. 22, 21, 21, 21, —, 23, 23, 23, 22, 23, 24, 22, 23; B. f. g. 26.5, 27, 27, 28, —, 26, 29, 26, 27, 27, 26, 26, 25 mm.

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*Smiths Misc. Coll., 76, 1923, pp. 7—8.

Characters given by Hartert (l. c. s.) for forms of *viridis* are:—

♂ *viridis*, Java. Shoulder patch turquoise blue.

♂ *zosterops*, Sumatra. Shoulder patch bluish green to greenish blue, but not becoming turquoise.

♂ *viriditectus*, Borneo. Shoulder patch clear pale green without any bluish tinge.

When large series are examined it appears impossible to maintain a Bornean race: the Sumatran bird is variable, the shoulder patch is frequently a pure green. Peninsular and Bornean birds vary to some degree likewise in this feature and we think that the birds from these three area should all stand as *zosterops*.

On Balabac and Palawan *C. palawanensis* occurs, but it does not seem to be the representative of any Bornean species.

127. **Chloropsis cyanopogon cyanopogon** (Temm.).

19 ♂ (black throats), 5 ♂ (green throats), 13 ♀ Kudat, Bettotan and Rayoh;

3 ♂. 4 ♀ Banguey Island.

"Iris dark; bill black; feet plumbeous."

Males (mainland).—T. L. 183, 178, 177, 178, 177, 186, 173, 172, 173, 185, 175, 174. 170, 173, 178, 174, 175, 175, 175; W. 83, 88, —, 84, 83, 86, 86, 70, 84, 85, 88, 86, 90, 88, 84, 85, 87, 82, 84; T. 68, 71, 65, 67, 70, 68, 72, 67, 68, 70, 70, 65, 75, 68, 67, 70, 72, 67, 67; Ts. 19, 23, 18, 19, 19.5, 20, 20, 19, 21, 20, 20, 22, 20, 20, 20, 20, 20, 20, 21; B. f. g. 22, 22, 22.5, 21.5, 22, 23, 21, 22, 21.5, 21, 21, 22, 21, 22, 21, 20, 20, 22, 21 mm.

(All the males listed above are fully adult, with black throats).

Females (mainland).—T. L. 172, 161, 167, 168, 178, 165, 174, 158, 162, 159, 162, 170, 155; W. 81, 77, 77, 77, 80, 80, 78, 77, 78, 78, 83, 76, 75; T. 67, 60, 65, 64, 60, 65, 65, 62, 63, 65, 68, 64, 62; Ts. 18, 17, 19, 17, 19, 20, 18, 19, 19, 20, 20, 20, 18; B. f. g. 22, 20.5, 21, 19, 21.5, 21, 22, 20, 20, 21, 20, 21, 19 mm.

Males (Banguey).—T. L. 173, 185, 182; W. 87, 86, 85; T. 67, 71, 67; Ts. 18, 20, 18.5; B. f. g. 23, 23, 22.5 mm.

Females (Banguey).—T. L. 185, 170, 170, 173: W. 82, 77, 78, 80; T. 70, 62, 64, 65; Ts. 20, 18.5, 18, 16.5; B. f. g. 24, 22, 21, 21 mm.

We cannot separate this large series, together with a number from Sarawak, from birds from the southern part of the Malay Peninsula. One of the females from Rayoh is without trace of the blue malar streak.

128. **Irena puella criniger** Sharpe.

4 ♂ ad., 3 ♂ imm., 5 ♀ Samawang River, Bettotan and Rayoh.

"Iris crimson; bill and feet black."

Males (adult).—T. L. 235, 230, 220, 225; W. 118, 114, 120, 117; T. 94, 90, 83, —; Ts. 19, 17, —, —; B. f. g. 31, 29, 27, — mm.

Females.—T. L. 223, 232, 228, 237, 236; W. 117, 115, 118, 113, 118; T. —, 85, —, 93, 93; Ts. —, 16, —, 18, 18; B. f. g. —, 30, —, 30, 29 mm.

I. tweeddalei of Palawan is a form of *puella*.

129. **Ixos malaccensis malaccensis** (Blyth).

2 ♂, 2 ♀ Samawang River and Rayoh.

"Iris red; bill black, base of mandible dark fleshy; feet brown."

Males.—T. L. 230, 215; W. 104, 108; T. 95, 95; Ts. 18.5, 22; B. f. g. 31, 29 mm.

Females.—T. L. 218, 220; W. 105, 102; T. 94, 94; Ts. 22, 23; B. f. g. 29, 28 mm.

Variation in the length and robustness of the bill in this species which we cannot separate into races, is considerable.

This species is not known from the Philippines.

130. **Iole olivacea charlottæ** (Finsch.).

Criniger charlottæ Finsch., Journ. Orn., 1867, p. 19 (Borneo).

14 ♂, 5 ♀ Samawang River, Bettotan and Rayoh;

1 ♂ Banguey Island.

"Iris white or greyish white; maxilla black; mandible grey; feet brown."

Males.—T. L. 190, 191, 198, 202, 192, —, 190, 195, 184, 195, 195, 200, 190, 197, 192; W. 90, 85, 86, 91, 89, 85, 92, 92, 80, 92, 85, 91, 93, 89, 91; T. 72, 77, 78, 82, 81, 81, 80, 78, 75, 85, 80, 80, 82, 89, 83; Ts. 19, 17, 20, 20, 19, 20, 22, 22, 20, 20, 21, 27, 24, 21, 23; B. f. g. 26, 24, 24, 26, 23, 25, 25, 26, 22, 21, 55, 25, 25, 26, 24 mm.

(*The measurements of the Banguey bird are given last.*)

Females.—T. L. 187, 88, 85, 82, 80; W. 82, 85, 85, 82, 82; T. 77, 75, 78, 76, 72; Ts. 18, 21, 21, 20, 19; B. f. g. 24, 25, 23, 23, 25 mm.

Rather yellower below than *olivacea* of the Malay Peninsula, but the same on the upperparts if fresh skins are compared. The Banguey bird seems exactly like some from the mainland.

Iole palawanensis occurs in Palawan and *I. haynaldi* in Sibutu: the latter cannot be associated with the species *Iole olivacea*.

131. **Euptilosus euptilosus** (Jard. and Selby).

3 ♂, 1 ♀ Samawang River, Bettotan and Rayoh.

"Iris red; bill black; feet black or grey."

Males.—T. L. 214, 211, 210; W. 96, 96, 98; T. 90, 93, 97; Ts. 20, —, —; B. f. g. 22, 24, 22 mm.

Female.—T. L. 205; W. 94; T. 88; Ts. 19.5; B. f. g. 22 mm.

These specimens have the upper parts more olive and less brown than the remainder of our series from Sarawak and the Malay Peninsula; but although the latter contains skins collected as recently as 1921 they have already suffered a post-mortem change.

The species does not occur in the Philippines.

132. **Brachypodius atriceps atriceps** (Temm.).

Microtarsus melanocephalus (Gm.) and Auct.

1 ♂ Bettotan.

"Iris pale blue; bill and feet black."

T. L. 162; W. 78; T. 65; Ts. 15; B. f. g. 19 mm.

Exactly like topotypes from Java.

Also found in Palawan.

133. **Criniger gutturalis gutturalis** (Bp.).

10 ♂, 14 ♀ Samawang River, Bettotan and Rayoh.

"Iris red; maxilla black; mandible grey; feet fleshy brown."

Males.—T. L. 229, 225, 223, 226, 232, 231, 217, 230, 231, 220; W. 108, 104, 105, 106, 112, 105, 108, 101, 113, 105; T. 105, 90, 95, 88, 98, 92, 95, 107, 106, 88; B. f. g. 29, 27, 28, 28, 29, 29, 27, 26, 27, 28 mm.

Females.—T. L. 223, 214, 221, 224, 213, 211, 216, 220, 220, 212, 212, 210, 221, 210; W. 106, 100, —, 104, 101, 97, 100, 101, 101, 103, 106, 104, —, —; Ts. 23, 21, —, 21, 22, 24, 23.5, 22, 24, 20, 25, 24, 24, 25; B. f. g. 25, 27, —, —, 27, 25, 27.5, 26. 27.5, 27, 27, 26, 25, 26 mm.

Birds from Sarawak and North Borneo are alike.

The closely allied *C. frater* occurs in Palawan, but it belongs to the *formenkreise* or species *tephrogenys* and not to *C. gutturalis* which has no Philippine representative.

134. **Alophoixus phaeocephalus connectens** Chas. and Kloss.

Alophoixus phaeocephalus connectens Chasen and Kloss, Journ. für Ornith., 1929, Band 2, p. 114.

Differs from *A. p. phaeocephalus* (Hartlaub) of Malacca in having the lower foreneck grey instead of white: and from *A. p. diardi* (Finsch) of Pontianak in the absence of yellow tips to the tail feathers.

Type. ♀ ad. Bettotan near Sandakan, British North Borneo, 6th July, 1927.

3 ♂, 5 ♀ Bettotan.

"Iris brown; maxilla black; mandible grey; feet yellowish flesh."

Males.—T. L. 213, 193, 205; W. 98, 88, 95; T. 88, 78, 83; Ts. 20, 20, 21; B. f. g. 26, 23, 23.5 mm.

Females.—T. L. 195, 195, 192, 189, 205; W. 91, —, 90, 88, 88; T. 80, 80, 77, 78, 77; B. f. g. 25, 25, 22, 22, 22.5 mm.

(*The measurements of the type are given first.*)

Except that it is without yellow tips to the tail feathers this well-marked form resembles *diardi* Finsch, of South-west Borneo more nearly than it does the concolorous-tailed *phaeocephalus* Hartl. of the Malay Peninsula and also Sumatra.

No doubt belong to it Adam's bird from Sandakan Bay (Elliot, Auk, 1890, VII, p. 349), and Guillemard's two skins from Silam, Darvel Bay, N. E. Borneo (P. Z. S., 1885, p. 413).

We have *diardi* from the Baram River, whence southward through Sarawak it is the only *Alophoixus* form represented.

The species does not occur in the Philippines.

185. Tricholestes criniger viridis (Bp.).

8 ♂, 7 ♀ Bettotan and Rayoh.

"Iris grey or brown; bill fleshy pink, culmen black; feet waxy yellow or ochreous."

Males.—T. L. 162, 160, 157, 156, 163, 162, 167, 165; W. 77, 73, 71, 71, 78, 78, 77, 77; T. 69, 67, 64, 67, 70, 72, 70, 74; Ts. 16, 15.5, —, 16, 18, 15, 15, 15; B. f. g. 18, 19, —, 19, 18, 18, 18.5, 19 mm.

Females.—T. L. 150, 164, 150, 152, 152, 148, 155; W. 68, 74, 67, 71, 72, 71, 74; T. 60, 67, 64, 62, 65, 65, 70; Ts. 15.5, 16, 16, 15.5, 17, 16, 16; B. f. g. 18, 18, 17, 17.5, 18, 17, 16 mm.

Much yellower on the underparts than typical *criniger* of the Malay Peninsula · the throat and breast strongly washed with yellow. Odd continental birds have yellowish throats and a specimen from Sarawak has the throat whitish as in *T. c. criniger*. On the upper parts the difference between the two forms is less obvious, but *viridis* is rather brighter.

These northern birds are perhaps scarcely so yellow as a series from central East Borneo which are possibly more topotypical, but the difference is negligeable.

The species does not occur in the Philippines

136. Trachycomus zeylanicus (Gm.).

Trachycomus ochrocephalus (Gm.) and auct.

1 ♂, 1 ♀, 1 ♀ imm. Rayoh.

"Iris amber; bill and feet black."

Male.—T. L. 270; W. 122; T. 115; B. f. g. 28 mm.

Female.—T. L. 255; W. 112; T. 107; B. f. g. 30 mm.

We cannot separate our large Malaysian series.

Not a Philippine species.

137. Pycnonotus goiavier gourdini (Jacq. and Puch.).

Ixos gourdini Jacq. and Pucher. Voy. Pole Sud, texte, Zool., iii, 1853, p. 79 (Banjermassin, S. Borneo).

6 ♂, 5 ♀ Bettotan, Kudat and Benoni.

"Iris dark; bill and feet black."

Males.—T. L. 205, 200, 203, 192, 192, 200; W. 88, 89, 88, 84, 88, 89; T. 85, 84, 85, 82, 85, 85; Ts. 22, 22, 22, 20, 20.5, —; B. f. g. 23, 22, 22.5, 21.5, 21, 21 mm.

Females.—T. L. 190, 193, 192, 183, —; W. 84, 82, 86, 80, 84; T. 78, 83, 85, 78, —; Ts. 21, 20, 20, 20,—; B. f. g. 21, 22, 22, 20, — mm.

We have hitherto regarded all Malaysian examples of this bulbul as *analis* Horsf. (Java) but close examination of our large series shows that there are constant differences in certain localities.

Bornean birds never have the superciliaries pure white but always clouded with brown, especially posteriorly: they also have the ear-coverts uniformly pale brown.

The Javan race, *analis*, has the superciliaries rather whiter and also has the anterior ear-coverts whitish. Malayan and Sumatran birds, which are *personata* Hume (Acheen, N. Sumatra), are yet much whiter on the superciliaries and ear-coverts. The squamations on the breast of the Bornean race are especially heavy.

Typical *goiavier* is Philippine, but no form of the species has been recorded from Palawan or Sibutu.

138. Pycnonotus plumosus insularis Chas. and Kloss.

Pycnonotus plumosus insularis Chasen and Kloss, Journ. für Ornith., 1929, Band 2, p. 115.

Like *P. p. plumosus* of the Malay Peninsula but rather larger and with the underparts paler, less brownish and more grey, and the under tail-coverts decidedly less yellow.

Type. Adult ♂, Banguey Island, British North Borneo, 3rd Sept., 1927.

"Iris red; bill black; feet brown."

1 ♂, 2 ♀, 1 sex? Banguey Island; 4 ♂ 1 ♀ Balambangan Island; 2 ♂ Mallewallé Island; 4 ♂, 4 ♀ Samawang River, Kudat and Rayoh.

Males (islands).—T. L. 196, 195, 205, 202, 204; W. 87, 88, 90, 89, 88; T. 82, 79, 83, 84, 79; Ts. 21, 20, 21, 22, 20.5; B. f. g. 23, 20, 23, 22.5, 23 mm.

Females (islands).—T. L. 193, 195, 187, 187; W. 88, 88, —, 86; T. 81, 80, 80, 76; Ts. 21, 20, 20, 20; B. f. g. 22, 20, 21, 22 mm.

Unsexed (islands).—T. L. 195, 192; W. 87, 86; T. 80, 81; Ts. 20.5, 20; B. f. g. 21, 22 mm.

Males (mainland).—T. L. 194, 190, 193, 195; W. 86, 84, 84, 85; T. 75, 76, 79, 80; Ts. 20, 20, 20, —; B. f. g. 23, 22, 21, 20 mm.

Females (mainland).—T. L. 178, 182, 185, 170; W. 84, 85, 79, 80; T. 68, 73, 74, 70; Ts. 23, 22, 20, 21; B. f. g. 20, 20, 21.5, 20 mm.

Our large series of fresh, unfaded skins show that this species must be separated into races (specimens that have been stored in a museum for only a few years are useless for critical examination).

The material is divisible as follows:

A. Darker or more brownish below: abdomen more washed with yellowish green; under tail-coverts richly coloured.
  (*a*) Irides yellow = West Sumatra and Mentawi Islands (*inornatus*).
  (*b*) Irides red.
    (*a*) Size smaller = Siam to Singapore, East Sumatra and Java (*plumosus*).
    (*b*) Size larger = China Sea Islands (*chiroplethis*).

B. Lighter or greyer below: abdomen less washed with yellowish-green; under tail-coverts much paler; irides red = ***insularis***.

The birds listed above from the mainland of North Borneo are not exactly like those from the islands. On colour they are certainly with ***insularis*** (rather than with ***plumosus***) but they are slightly smaller and scarcely as pale on the tail-coverts. They are, in fact, *P. plumosus plumosus* >< *insularis*. Unfortunately we have no fresh skins from Sarawak.

P. ***plumosus*** has been recorded from Cagayan Sulu and *P. cinereifrons* of Palawan is a subspecies of it.

139. Pycnonotus brunneus brunneus Blyth.

Pycnonotus brunneus zaphaeus Oberholser, (pt.), Proc. U. S. Nat. Mus., vol. 54, 1917, p. 194 (Mata Sireh Id., Java Sea; and Borneo).

14 ♂, 12 ♀ Samawang River, Bettotan and Rayoh;

2 ♂, 2 ♀ Banguey Island.

"Iris orange, orange-red or red; bill black; feet brown" (adult).

"Iris brown, yellow or dark" (immature).

Males (Banguey).—T. L. 178, 186; W. 83, 89; T. 71, 77; Ts. 18, 20; B. f. g. 20, 23 mm.

Females (Banguey).—T. L. 177, 183; W. 83, 82; T. 73, 76; Ts. 20, 19.5; B. f. g. 20, 19.5 mm.

Males (Mainland).—T. L. 178, 188, 180, 185, 190, 182, 180, 188, 190, 170, 170, 188, 183, 175; W. 86, 84, 85, 89, 87, 86, 90, 85, 88, —, 84, 88, 85, 86; T. 71, 73, 72, 76, 77, 76, 78, 75, 80, 67, 60, 76, 77, 75; Ts. 20, 21, 20, 23, 23, 20, 24, 23, 22, 20, 23, 23, 22, 22; B. f. g. 23, 23.5, 22, 21, 22, 20, 20, 22, 21, 18, 22, 21, 21, 17 mm.

Females (Mainland).—T. L. 182, 183, 176, 170, 175, 182, 175, 180, 170, 180, 170, 176; W. 79, 78, 81, 80, 81, 81, 83, 84, 83, 85, 85, 85; T. 73, 70, 66, 69, 72, 73, 70, 78, 70, 78, 70, 75, 72, 75; Ts. 19.5, 19, 20, 19, 20, 19.5, 22, 20, 20, 23, 20, 23; B. f. g. 20, 20, 20, 22, 21, 21, 20, 20, 21, 20, 20, 22 mm.

We have large series of this bulbul from various parts of Malaysia (it does not occur in Java) and cannot detect the slightest difference in colour between fresh, newly moulted skins from any two localities. The following are the wing-ranges and average measurements of good series of birds:—

Malay Peninsula ...	... 74 - 88	average	81.5 mm.
Sumatra ...	... 77 - 89	,,	81.5 mm.
Sarawak ...	... 79 - 84	,,	82 mm.
British North Borneo	... 78 - 90	,,	84 mm.
Anamba Islands	.. 82 - 90	,,	87 mm.

We cannot recognise more than two races in this ample material, *zapolius*[*] from the Anamba Islands representing the maximum development of the species.

The species does not occur in the Philippines.

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[*] *Pycnonotus brunneus zapolius* Oberh. Bull. U. S. Nat. Mus., 98, 1917, p. 45: Chasen and Kloss, Journ. Malayan Branch Roy. Asiat. Soc., vi, 1928, p. 58.

140. Pycnonotus simplex perplexus Chas. and Kloss.

Pycnonotus simplex perplexus Chasen and Kloss, Journ. für Ornith., 1929, Band 2, p. 116.

Like *simplex* of the Malay Peninsula but the irides crimson instead of white.

Type. ♂ ad. Balambangan Island, British North Borneo 12th Sept., 1927.

3 ♂, 1 ♀, 1 ♀ imm. Balambangan Island; 2 ♀ Rayoh.

"Iris crimson; maxilla black; mandible black, pale at the base; feet brown." (Balambangan, C. B. K. and F. N. C.).

"Iris crome or scarlet." (Rayoh, Native Coll.).

Males (*Balambangan*).—T. L. 179, 182, 180; W. 84, 82, 85; T. 73, 73, 78; Ts. 17.5, 17, 18; B. f. g. 19, 20.5, 19 mm.

Female (*Balambangan*).—T. L. 168; W. 79; T. 73; Ts. 17; B. f. g. 20 mm.

Females (*Rayoh*).—T. L. 170, 172; W. 78, 75; T. 75, 70; Ts. 20, 19; B. f. g. 19, 19 mm.

In the Malay Peninsula we have examined many examples of *simplex* in the flesh and, if adult, all had white irides (grey or brownish in young birds): Sumatran birds agree, as do those of the Anamba Islands, *P. s. halizonus* Oberholser, a large race.

In Borneo *brunneus* and *simplex* occur side by side and in both the irides are reddish or orange (brownish or grey in immature birds) and never white.

If fresh, newly-moulted skins are compared birds from Sumatra, the Malay Peninsula, Borneo, Balambangan Island, the Anamba Islands and the Natuna Islands are seen to be exactly alike. In the only bird of our series from Sarawak in which the colours of the soft parts are stated on the label the colour of the irides is given as "red".

P. s. prillwitzi Hartert, of Java also has the irides orange or orange-yellow but this bird is much paler than *perplexus* and it also has the under tail-coverts very much more buffy.

The species does not occur in the Philippines.

141. Pycnonotus erythropthalmos salvadori Sharpe.

12 ♂, 3 ♀ Rayoh.

"Iris red, eyelids yellow; bill black; feet fleshy-brown."

"Iris dark" (juv.).

Males.—T. L. 168, 172, 167, 166, 156, 175, 155, 175, 161, 165, 172, 165; W. 77.5, 76, 80, 77, 76, 78, 76, 80, 79, 76, 76, 78; T. 68, 72, 74, 74, 70, 70, 70, 76, 74, 71, 72, 68; Ts. —, 17.5, 17, 18, 17, 18, 18, 18, 18, 18, 19, 19; B. f. g. 16, 19, 17, 20, 17, 18, 17, 18, 18, 19, 19, 18 mm.

Females.—T. L. 158, 175, 165; W. 78, 75, 75; T. 75, 66, 70; Ts. 18, 18, 18; B. f. g. 18, 16, 18 mm.

P. e. salvadori is a very "thin" race: as a series birds from Sarawak and North Borneo are separable from continental birds by their darker (browner and less grey) underparts; the whitish throat of the former is therefore rather more obvious. We should not care to determine isolated individuals of this species and in the Malay Peninsula occur birds inseparable from *salvadori* (and also from *cyanochrus* of Sumatra).

Fresh skins from Borneo and the Malay Peninsula are alike on the upperparts.

The species does not occur in the Philippines.

142. **Pycnonotus cyaniventris paroticalis** (Sharpe).

Ixidia paroticalis Sharpe, Ibis, 1878, p. 419.

2 ♂ Samawang River and Bettotan.

"Iris dark; bill black; feet plumbeous."

T. L. 158, 170; W. 75, 75; T. 65, 68; Ts. 16, 16; B. f. g. 18, 18 mm.

Very like *cyaniventris* of the Malay Peninsula but darker on the crown, sides of the head and underparts. *I. paroticalis* was not accepted by Büttikofer* but we consider that it is a good, but by no means well-marked race. There seems little, if any, difference in size between these two forms: birds from the Malay Peninsula often have the wing measuring 75 mm. and attain a maximum of 77 mm.

The species does not occur in the Philippines.

143. **Rubigula squamata webberi** (Hume).

1 ♂, 1 ♀ Rayoh.

"Iris red or crome; bill black: feet grey."

Male.—T. L. 155; W. 77; T. 64; B. f. g. 17 mm.

Female.—T. L. 155; W. 72; T. 65; B. f. g. 18 mm.

Like topotypes and specimens from Sarawak.

The species does not occur in the Philippines.

TIMALIIDAE

144. **Pomatorhinus montanus borneensis** Cab.

4 ♂, 1 ♀ Samawang River, Bettotan and Kota Belud.

"Iris yellow; maxilla black, edge and tip white; mandible greyish white; feet plumbeous."

Males.—T. L. 197, 190, 200, —; W. 88, 86, 88, —; T. 85, 82, 85, —; Ts. 28, 31, 30, —; B. f. g. 26, 28, 26, — mm.

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*Notes Leyden Mus., xxi, 1900, p. 224.

Female.—T. L. 195; W. 83 (imp.); T. 83; Ts. 27; B. f. g. 27 mm.

Pomatorhinus is not found in the Philippines.

145. **Malacocincla abbotti büttikoferi** Finsch.

Malacocincla abbotti (pt.). Büttikofer, Notes Leyd. Mus., xvii, 1895, p. 79.

Malacocincla Büttikoferi Finsch, Notes Leyd. Mus., xxii, 1901. p. 218 (South-east Borneo).

1 ♂ Bengkoka River, Marudu Bay.

"Iris rich brown; maxilla dark slate; mandible pale slate; feet pale brown."

T. L. 156; W. 78; T. 46; Ts. 27; B. f. g. 24 mm.

Generally much duller and darker than *abbotti olivacea* from the Malay Peninsula, both above and below entirely lacking the rich warm tones of that bird, the under tail-coverts alone being brownish-rufous. *M. a büttikoferi* is a very well defined subspecies. We have seen other examples from South Sarawak and middle East Borneo.

146. **Malacocincla sepiaria harterti** Chas. and Kloss.

Malacocincla sepiaria harterti Chasen and Kloss, Journ. für Ornith., 1929, Band 2, p. 116.

Like *M. s. rufiventris* Salvad. from Sarawak but the underparts rather less richly coloured, less generally suffused with ochraceous-tawny, and the crown and nape averaging slightly less grey. In both races there is some variation in the colour of the crown, this being occasionally almost concolorous with the mantle, but as a series the Sarawak birds have decidedly darker heads.

Type. ♂ ad. Bettotan near Sandakan, British North Borneo, 25th July, 1927.

6 ♂, 6 ♀ Samawang River and Bettotan.

"Iris brown, hazel or red; maxilla black; mandible grey; feet fleshy."

Males.—T. L. 148, 146, 151, 150, 135, 142; W. 74, 78, 73, 73, 73, 73; T. 43, 38, 42, 38, 36, 35; Ts. 27, 27, 27, 28, 26, 26; B. f. g. 22, 22, 21, 20, 20, 20 mm.

(The measurements of the type are given first.)

Females.—T. L. 143, 142, 142, —, 142, 140; W. 70, 76, 71, 73, 73, 71; T. 41, 43, 34, —, 36, 35; Ts. 27, 28, 28, 28, 25, 28; B. f. g. 21.5, 22, 21, 22, 21, 21 mm.

An immature male has a distinct rich brown post-orbital stripe.

The Bornean forms of *Malacocincla* have been much confused. In Sarawak and North Borneo alone at least three very distinct forms occur. In the lowlands of Sarawak a brightly coloured bird with a superficial resemblance to *Anuropsis malaccensis* is common; it has the crown dark grey and well defined against the brownish mantle and the underparts strongly washed with tawny: this is *Malacocincla rufiventris* Salvad. (*Ptilopyga* (!) *rufiventris* of the Cat. Birds, syn. *Turdinus tephrops* Sharpe: Mt. Kalulong). In the territory of North Borneo this is replaced by the bird we have named above . it differs mainly in that the crown and mantle are less contrasted and the underparts less extensively tawny. Long series of both these birds are before us but the ranges have yet to be worked out in detail: *M. s rufiventris*, however, is found at least as far north as the Baram River on the west, and on the east we have seen it from almost equally as far north. Side by side with *rufiventris* and *harterti* occurs a much duller bird with a larger bill. It has the underparts dirty whitish grey washed with brownish and entirely without rufous except on the under tail-coverts, while the upperparts are uniformly dull brown except for a few indistinct paler streaks on the forehead. This is *M. büttikoferi* which we regard as a well marked form of *abbotti*: *rufiventris* and *harterti* are the Bornean forms of *sepiaria* and our arrangement of the Malaysian members of the group (omitting certain small island forms named by Oberholser and not examined by us) is

Malacocincla sepiaria.

M. s. sepiaria	West Java.
M. s. minor	East Java*
M. s. tardinata	Malay Peninsula and (?) N. E. Sumatra.†
M. s. barussana	West Sumatra.
M. s. rufiventris	Sarawak and Dutch Borneo.
M. s. harterti	North Borneo.

Malacocincla abbotti.

M. a. abbotti	Malay Peninsula (North of Penang).
M. a. olivacea	Malay Peninsula (South of Penang) and Sumatra.‡
M. a. büttikoferi	Borneo.
M. a. baweana	Bawean Id., Java Sea.

Malacocincla does not occur in the Philippines.

**Vide* Kloss, Journ. Fed. Mal. States Mus., x, 1921, p 220.

†Robinson and Kloss identified two birds from N. E. Sumatra as *s. sepiaria* in Journ. Straits Branch Roy. Asiat. Soc., 1919, p. 114 but they have bright under tail-coverts and are nearer to *tardinata* than to *sepiaria*.

‡*Vide* Robinson and Kloss, Journ. Fed. Mal. States Mus., xi, 1924, p. 196.

147. Turdinus atrigularis (Bp.).

10 ♂, 4 ♀ Samawang River and Bettotan.

"Iris brown; bill black, grey at base of mandible; feet brown."

Males.—T. L. 220, 215, 222, 221, 208, 215, 217, 214, 216, 216; W. 102, 101, 105, 105, 106, 107, 104, 104, 101, 98; T. 73, 72, 75, 76, 72, 76, 76, 76, 77, 73; Ts. 36, 36, 34, 32, 34, 35, 35, 36, 32, 35; B. f. g. 29, 26.5, 31, 28, 29, 30, 30, 28, 29, 29 mm.

Females.—T. L. 221, 206, 203, 207; W. 106, 105, 98, 99; T. 81, 65, 67, 73; Ts. 33, 32, 34, 32.5; B. f. g. 31, 28, 27, 28 mm.

The type of *atrigularis* came from Banjermassin in South Borneo.

Turdinus (restr.) does not occur in the Philippines.

148. Erythrocichla bicolor (Lesson).

Erythrocichla bicolor whiteheadi Hartert, Bull. B. O. C., xxxvi, 1915, p. 36 (Sarawak).

14 ♂, 4 ♀ Samawang River, Bettotan, Kota Belud and Rayoh.

"Iris hazel; maxilla brown; mandible brown or gery, base fleshy; feet dark fleshy."

Males.—T. L. 185, 188, 193, 190, 192, 192, 190, 185, 185, 172, 185, 176, 175, —; W. 85, 88, 87, 88, 85, 88, 90, 88, 88, 83, 87, 81, 90, —; T. 70, 77, 74, 74, 73, 77, 76, 72, 72, 75, 71, 68, 72, —; Ts. 34, 39, 31, 30, 31, 33, 32, 30, 30, 30, 29, 29, 30, —; B. f. g. 25, 24, 26, 27, 25, 25, 26, 27, 26, 25, 25, 25, 25, — mm.

Females.—T. L. 172, 173, 170, 170; W. 78, 82, 85, 84; T. 68, 65, 66, 62; Ts. —, 27, 30, 29; B. f. g. 24, 23, 24, 24 mm.

The colour of the crown in the species is curiously variable and examples with dull crowns occur in our large series from the Malay Peninsula. We cannot separate, even on average differences, the twenty-five birds before us from North Borneo and Sarawak from a larger continental series.

Erythrocichla bicolor does not occur in the Philippines.

149. Pellorneum capistratum morrelli Chas. and Kloss.

Pellorneum capistratum morrelli Chasen and Kloss, Journ. für Onith., 1929, Band 2, p. 118.

Like *P. c. capistratoides* of Sarawak but the underparts much paler, the breast yellower and less rufous, the flanks and upperparts less saturate; and the lores and ear-coverts paler, greyer, less black.

Type. ♂ ad. Kudat, British North Borneo, 19th Sept. 1927.

21 ♂, 5 ♀ Samawang River, Bettotan, Kudat, Rayoh and Benoni.

1 ♂ Banguey Island.

Males.—T. L. 166, 167, 172, 175, 162, 164, 172, 163, 159, —, 168, 167, 164, 165, 158, 163, 165, 154, 165; W. 70, 71, 73, 73, 71, 65, 70, 69, 67, 71, 70, 71, 70, 72, 68, 70, 70, 73, 68; T. 52, 52, 61, 63, 56, 52, 55, 53, —, 55, 55, 56, 60, 56, 50, 52, 55, 57, 60; Ts. 31, 31, 30, 31, 32, 32.5, 32, 31.5, 29, 29, 30, 30, 28, 32, 29, 30, 31, 30, 30; B. f. g. 21, 20, 20, 20, 23, 21.5, 23.5, 20.5, 23, 21, 22, 23, 22, 22, 23, 22, 22, 21, 22 mm.

(The measurements of the type are given first and those of the Banguey bird last.)

Females.—T. L. 167, 157, 167, 162; W. 69, 56, 69, 69; T. 53, 49, 56, 53; Ts. 30, 30, 29, 31; B. f. g. 22, 21, 22, 22 mm.

We do not know the exact locality of Temminck's birds on which *Goldana capistratoides* Strick., is founded; but we feel justified in considering that they are the same as the race inhabiting Sarawak: and it is safe to presume that the type came from the southern half of Borneo.

The specimen from Banguey is not separable from those from the mainland and in the large series before us the sexes are exactly alike. The twenty-three North Bornean skins have been compared with six from Sarawak: two of the males from Bettotan and a pair from Rayoh are very close to the Sarawak specimens in general colour. All of our series of *morrelli* have the lores and ear-coverts dark grey, the latter sometimes ticked with white and posteriorly nearly always washed with brown.

In the Sarawak birds the lores and ear-coverts average darker; sometimes they are almost black. The wing-range of Sarawak birds is 70 - 78 mm.

[Named in honour of Mr. E. MORRELL, Resident of Kudat, from whom we received much assistance during our visit to Kudat and the islands.]

This species does not occur in the Philippines.

150. **Aethostoma rostrata macroptera** (Salvad.).

Brachypteryx macroptera Salvad., Atti. R. Ac. Sc. Tor. iii, 1868, p. 528 (Sarawak).

Aethostoma witmeri Sharpe, Handlist of Birds, iv, 1903, p. 358.

Aethostoma rostratum umbratile Moulton (nec Strick.), Journ. Straits Branch Roy. Asiat. Soc., 67, 1914, p. 166.

6 ♂, 3 ♀ Bettotan, Kota Belud and Benoni; 1 ♂, 1 ♀ Banguey Island.

"Iris brown; maxilla black; mandible plumbeous; feet brown to fleshy."

Males.—T. L. 153, 143, 152, 150, 142, —, —; W. 74, 68, 74, 70, 69, 78, 79; T. 50, 48, 51, 50, 50, —, —; Ts. 26, 26, 26, 23.5, 24, —, —; B. f. g. 22.5, 20, 22, 23, 20.5, —, — mm.

Females.—T. L. 152, 155, 150, 148; W. 70, 72, 80, 70; T. 47, 50, 46, 48; Ts. 24, 27, 25, 25; B. f. g. 22, 22, 22, 22 mm.

(*The measurements of the Banguey birds are given last.*)

A well-defined race, much paler, more olive and less russet above than typical *rostrata* of Singapore (from which *Brachypteryx buxtoni*, Tweeddale, cannot be separated): the Banguey birds are perhaps a trifle darker on the upperparts.

This species does not occur in the Philippines.

151. **Malacopteron magnum saba** subsp. nov.

Like *M. m. magnum* Eyton, of Malacca, but the black on the occiput greatly reduced.

Type.—Adult ♂, Samawang River near Sandakan, British North Borneo, 11th July, 1927.

13 ♂, 3 ♀ Samawang River, Bettotan and Rayoh.

"Iris red; maxilla black; mandible grey; feet plumbeous."

Males.—T. L. 195, 195, 188, 192, 183, 188, 200, 187, 193, 202, 176, 172, 172; W. 91, 91, 88, 92, 87, 87, 91 ,91, 93, 93, 83, 78, 90: T. 76, 75, 74, 77, 73, 72, 82, 77, 76, 77, 67, 67, 76; Ts. 22.5, 25, 24, —, 25, 24, —, 23, 25, 25, 24.5, 23, 24; B. f. g. 24, 23, 24, 24, 25, 24, 25, 25, 25, 24.5, 22, 22.5, 23 mm.

Females.—T. L. 187, 173, 172; W. 81, 85, 83; T. 79, 72, 70; Ts. 23, 23, 24; B. f. g. 22, 22, 22 mm.

(The measurements of the type are given last.)

This is a very uniform series and although there is a certain amount of variation in the area of black on the nape this is never extensive as in our series of typical *magnum*. In several of the North Bornean birds the black patch is represented by merely a narrow black edging to the chestnut crown. It is curious that such a well-marked race has remained undescribed, but it has no doubt escaped notice owing to the fact that Sarawak birds are not separable from typical *magnum*.

Napothera pilcata Bp., "Sumatra, Borneo" cannot be taken as referring to this form, apparently restricted in range to Northern Borneo.

We delayed publication of the description of this new form as, in spite of the large series before us, there seemed just a possibility that the differences were due to the make-up of the skins. One of us, however, has been again collecting in Borneo quite recently and after paying particular attention to this bird in the flesh is convinced that the Bornean race is really separable on the characters given above.

*M. palawanense** of Palawan may be an extreme form of this species characterised by an entire absence of black on the occiput and by larger size. The North Bornean race is intermediate between it and the typical form.

152. Malacopteron cinereum cinereum Eyton.

11 ♂, 5 ♀, 1 juv. Samawang River, Bettotan and Rayoh.

"Iris dark; maxilla black; mandible grey with base fleshy or entirely fleshy; feet plumbeous or greyish pink.

Males.—T. L. 172, 168, 154, 173, 172, 168, 153, 163, 168, 172, 171; W. 80, 78, 80, 79, 80, 78, 74, 80, 79, 80, 80; T. 74, 68, 58 (imp.), 68, 68, 62 (imp.), 61, 63, 72, 67, 70; Ts. 21, 20.5, 19.5, 20, 21.5, 20, 20.5, 21, 24, 20, 22; B. f. g. 20.5, 20, —, —, 21, 21.5, 19.5, 22, 21, 20, 22 mm.

Females.—T. L. 153, 177, 165, 176, 148; W. 71, 72, 78, 77, 73: T. 60, 62, 65, 62, 58; Ts. 19.5, —, —, —, 20; B. f. g. 20, —, —, —, 19 mm.

These birds are not separable from typical *cinereum* of Malacca of which we have large series. In the juvenile the top of the head is chestnut and black as in adults.

This species is not known from the Philippines.

153. Malacopteron magnirostris kalulongae (Sharpe).

4 ♂, 1 ♀, 1 sex ? Samawang River, Bettotan and Rayoh.

"Iris red; maxilla black; mandible grey; feet plumbeous."

Males.—T. L. 167, 153, 168, 164; W. 77, 71, 78, 75; T. 79, 61, 70, 70; Ts. 21 5, 20, 21, 22; B. f. g. 21, 20, 20, 21 mm.

Females.—T. L. 158; W. 73; T. 68; Ts. 21; B. f. g. 21 mm.

Birds from the lowlands of North Borneo and Sarawak are darker and greyer (less brown) on the crown than a very large series of *magnirostris* from the Malay Peninsula but a few Bornean birds, amongst which the colour of the crown is very variable, are exactly like typical *magnirostris*. We have seen examples from middle East Borneo and consider *kalulongae* to be found throughout the island

Alcippe (later *Setaria*) *cinereocapilla* Salvad., Atti. R. Ac. Sc. di Tor., iii, 1868, p. 568, is a troublesome name that is possibly applicable, with priority, to this bird.

No form known from the Philippines.

**Trichostoma rufifrons* Tweedale, Proc. Zool Soc., 1878, p. 616, pl. 38: *Malacopteron palawanense* nom. nov. Buttik., Notes Leyd. Mus, xvii, p. 104.

154. **Malacopteron affine affine** (Blyth).

13 ♂, 9 ♀, 1 ?, 2 imm. ex. Bettotan and Rayoh.

"Iris brown; maxilla black; mandible grey; feet plumbeous."

Males.—T. L. 174, 168, 168, 163, 160, 162, 165, 160, 153, 150, 165, 162, —; W. 76, 76, 75, 77, 76, 76, 75, 71, 74, 71, 72, 76, 73; T. 71, —, 70, 70, 69, 70, 69, 70, 65, 70, 60, 67, 65; Ts. 22, 20, 22, 22, 21, 22, 20, 23, 22, 21, 22, 22, 22; B. f. g. 22, 20, 20, 21, 19.5, 20, 20, 18, 17, 20, 20, 20, 19 mm.

Females.—T. L. 170, 145, 154, 164, 165, 166, 155, 152, 165; W. 75, 69, 70, 70, 73, 78, 72, 67, 74; T. 71, 62, 65, 64, 65, 65, 61, 62, 68; Ts. 22.5, 20, 20, 20, 21, 22, 21, 20, 22; B. f. g. 22, 20, 20, 21, 19.5, 19, 20, 19, 19, 20, 20, 19, 23 mm.

Absolutely inseparable from *affine* of the south of the Malay Peninsula. The crown is darkest in old birds and in a series this feature is therefore variable. To birds with the darker crowns the names *melanocephala* Davison (Pahang) and *atricapilla* Bp. (Sumatra) have been given.

No form known from the Philippines.

155. **Ptilocichla leucogrammica** (Bp.).

Cacopitta leucogrammica Bp., Consp. Av., 1, 1850, p. 257 (Borneo).

2 ♂ Bettotan.

"Iris dark; maxilla black; mandibles plumbeous, tip black; feet plumbeous."

T. L. 177, 185; W. 78, 80; T. 45, 53; Ts. 35, 33; B. f. g. 28, 27.5 mm.

Ptilopyga Sharpe (Cat. Birds, vii, p. 585) is founded on *Malacocincla* Salvad., Ucc. Born., 1874, p. 229. The only species included in Salvadori's *Malacocincla* is ***rufiventris*** **Salvad.** which is a subspecies of *Malacocincla sepiaria*: *Ptilopyga* is therefore a synonym of *Malacocincla*. In the Handlist of Birds, iv, p. 34, *rufiventris* is withdrawn from the genus, but *Ptilopyga* cannot be used for *leucogrammica* as Büttikofer suggested in Notes Leyd. Mus., xvii, 1896, p. 71, and we have placed the bird in the Philippine genus *Ptilocichla* to which it bears some superficial resemblance.

Apparently represented in the Philippines by *Ptilocichla basilanica* and *P. mindanensis*, Steere, which may be subspecies of it.

156. **Anuropsis malaccensis poliogenis** (Strickl).

Anuropsis malaccensis sordidus Chasen and Kloss, Journ. für Ornith., 1929, Band 2, p. 119.

Like *A. m. malaccensis* of the Malay Peninsula but the mantle and back greyish olivaceous contrasting with the brown crown: the rump less rusty.

10 ♂, 6 ♀ Samawang River, Bettotan and Rayoh.

"Iris brown; maxilla black; mandible plumbeous; feet fleshy."

Males.—T. L. 146, 148, 144, 143, 143, 138, 132, 135, 136, —; W. 72, 72, 75, 72, 71, 70, 62, 70, 70, 70, 71; T. 40, 40, 40, 39, 35, 38, 33, 36, 40, 36; Ts. 30, 29, 28, 32, 29.5, 29, 30, 30, 28, 26; B. f. g. 21.5, 20, 21, 22, 23, 21, 22, 21, 24, 23 mm.

Females.—T. L. 134, 142, 143, 130, 140, 135; W. 72, 67, 68, 67, 73, 66; T. 33, 40, 37, 33, 35, 36; B. f. g. 19.5, 21.5, —, 21, 23, 21 mm.

These birds cannot be associated with *A. m. saturatus* Rob. and Kloss*, from Sarawak which has the underparts very much more richly coloured, the crown darker, earthy brown or more concolorous with the mantle with no rufous tinge and the grey cheeks blackened. In no case could birds of the two forms be confused: *saturatus* is the race occurring along the Baram River and down the west side of Borneo at least as far as the Kapuas River basin

Central East Borneo is inhabited by birds practically inseparable from the present series (though varying a little among themselves in the colour of the crown) and all appear to be like specimens from the Karau River (a left bank tributary of the Barito, S. E. Borneo). which are topotypes of *Myiothera poliogenis* Strickl. (*vide* Büttikofer Noter Leyden Museum, xviii, p. 84; xxi, p. 241—2).

It appears advisable for the present, therefore to regard *sordidus* as a synonym of *poliogenis*, though differences may be later found to exist between topotypes of the latter and the birds from the north.

A. m. saturatus may, for the time being, be considered to inhabit western Borneo south of the Baram River while the north and the eastern parts are occupied by *A. m. poliogenis*.

A. cinereiceps of Palawan is a form of this species.

157. **Alcippe cinerea cinerea** Blyth.

Alcippornis brunneicauda eriphaea Oberholser, Smiths. Misc. Coll., 74, 1922, p. 2 (Central Borneo).

2 ♂, 4 ♀ Samawang River and Bettotan.

"Iris grey, brownish grey or dark; bill brown; mandible paler; feet plumbeous or brownish grey."

Males.—T. L. 142, 147; W. 69, 72; T. 57, 61; Ts. 20, 20; B. f. g. 16, 15 mm.

Females.—T. L. 145, 143, 146, 147; W. 68, 57, 68, 67; T. 63, 57, 53, 61; Ts. 22, 21.5, 21, 21; B. f. g. 17.5, 16, 16.5, 16 mm.

We have good recently collected, newly moulted series of this bird from the Malay Peninsula, Sumatra, the Natuna Ids., Sarawak and East Borneo and cannot appreciate any essential difference between them and the examples listed above. Old museum skins undergo a marked postmortem change and are much more rufescent above, especially on the upper tail-coverts and tail; and a certain reddening of the brown element in the plumage is also evident even in newly collected birds wearing the plumage of the previous year. In the fresh plumage the upperparts are strongly olivaceous and the upper tail-coverts and tail are but little browner than the mantle. As the plumage becomes worn the olive element fades out and tail-coverts and quills become rufescent. The type of *Alcippornis brunneicauda eriphaea* Oberh (l. c. s.) from Liang Koeboeng in Central Borneo was twenty-eight years old when described! Various old skins in our collection fit its description perfectly.

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*Bull. B. O. C., xl, 1920, p. 68.

Not known from the Philippines.

158. Stachyris poliocephala poliocephala (Temm.).

Stachyris poliocephala diluta Rob. and Kloss, Ibis, 1918, p. 587; Perak, Malay Peninsula.

3 ♂ Bettotan.

"Iris yellow; maxilla black; mandible plumbeous, tip black. feet olive."

Males.—T. L. 140, 152, 147; W. 66, 70, 66; T. 46, 55, 50; Ts. 23, 24, 24; B. f. g. 20, 21, 22 mm.

Not known from the Philippines.

159. Stachyris nigricollis nigricollis (Temm.).

6 ♂, 3 ♀; 2 juv. Samawang River, Bettotan and Rayoh.

"Iris red; maxilla black; mandible grey, tip black; feet plumbeous."

Males.—T. L. 159, 162, 170, 162, 157, 155; W. 77, 77, 78, 72, 72, 75; T. 58, 58, 60, 54, 56, 56; Ts. 23, 25, 25, 26, 28, 29; B. f. g. 21.5, 22, 23, 22, 21 mm.

Females.—T. L. 158, 157, 155; W. 75, 70, 75; T. 55, 55, 56; Ts. 26, 23, 25; B. f. g. 21, 21.5, 21 mm.

The juveniles are like the adults except that they have the nape washed with rich brown thereby resembling continental adults. The Malayan form of this bird is *Stachyris nigricollis erythronotus* (Blyth).* It differs from typical *nigricollis* of Borneo in having less white on the forehead, the crown less black, the nape more extensively suffused with chestnut and the white gorget rather narrower. A single specimen from Sumatra seems nearer to *nigricollis* than to *erythronotus*.

Not known from the Philippines.

**Timalia erythronotus* Journ. Asiat. Soc. Bengal, xi. 1842, p. 793 (Malacca).

160. Stachyris leucotis goodsoni Hartert.

Stachyris leucotis goodsoni Hartert, Bull., B. O. C., xxxvi, 1915, p. 7 (Gunong Mulu, N. Sarawak), Rob. and Kloss, Ibis, 1918, p. 587.

3 ♂, 1 ♀ Bettotan.

"Iris dark; maxilla black; mandible plumbeous; feet brownish olive."

Males.—T. L. 155, 154, 158; W. 67, 66, 70; T. 48, 50. 55; Ts. 24, 22, 25; B. f. g. 21, 21, 20 mm.

Female.—T. L. 150; W. 68; T. 47; Ts. 24; B. f. g. 21 mm.

Bornean birds have the crown rather greyer and less brown than those from the Malay Peninsula but in fresh skins we can detect no other difference in the general tone of the plumage. Old skins are more rusty brown on the upper parts than newly collected material and the birds listed above are paler and more olive than some from Sarawak the most recent of which is dated 1919: these latter are not so rufous as yet older skins from Johore.

Most birds from the Malay Peninsula have the wing-coverts tipped with creamy or brownish buff but sometimes these markings are almost white and sometimes quite rusty. The wing-markings of Bornean birds *average* more rufous and less bold but some birds from the Malay States and Borneo are absolutely inseparable. Most continental birds have the lores creamy or whitish although specimens with rufous lores do occur: in Borneo the lores are invariably rufous.

Not known from the Philippines.

161. Stachyris maculata (Temm.).

8 ♂, 3 ♀ Samawang River and Bettotan.

"Iris yellow; orbital skin blue; maxilla black; mandible grey. tip black; neck skin turquoise; feet plumbeous."

Males.—T. L. 177, 170, 180, 168, 180, 187, 189, 187; W. 86, 81, 83. 79, 86, 80, 87, 83; T. 70, 67, 71, 68, 70, 76, 78, 72; Ts. 24.5, 25, 26, 25, 26, 26, 25, 26; B. f. g. 23, 23, 24, 23, 24, 24, 25, 23 mm.

Females.—T. L. 172. 180, 178; W. 81, 85, 82; T. 62, 75, 68; Ts. 23, 25, 25.5; B. f. g. 21, 23.5, 24 mm.

In 1918 (Ibis, p. 587) Robinson and Kloss considered that a Malayan form was recognisable. In the larger series from the Peninsula and Borneo now before us (of which those listed above are only a part) it is true that a few Malayan skins have the characters attributed to *Timalia pectoralis* Blyth, by Robinson and Kloss; but the greater part of the series is inseparable from typical *maculata*.

Not known from the Philippines.

162. Cyanoderma erythroptera bicolor (Blyth).

Cyanoderma labuanensis Collin and Hartert, Nov. Zool., xxxiv, 1927, p. 51.

14 ♂, 12 ♀ Samawang River, Bettotan, Kudat, Kota Belud and Kayoh.

1 ♂, 1 ♀ Banguey Island.

"Iris dark; orbital skin blue; bill black; neck skin turquoise; feet dark brown or brownish grey."

Males.—T. L. 135, 135, 128, 125, 130, 134, 138, 125, 132, 128, 132, 130, 134, 133, —; W. 60, 58, 58, 60, 62, 59, 62, 57, 61, 61, 60, 58, 60, 62, —; T. 50, 47, 46, 48, 50, 48, 50, 43, 51, 45, 46, 45, 51, 47, —; Ts. 21, 21, 21, 20, 21, 19.5, 20, 21, 21, 22, 21, 23, 21, 22, —; B. f. g. 17, 17, 18, 18, 16, 16.5, 18, 16, 16, 17, 17, 17, 17, 17.5, — mm.

Females.—T. L. 123, 127, 115, 117, 125, 126, 130, 123, 125, 133, 125, —, —; W. 57, 56, 58, 57, 56, 58, 59, 57, 56, 59, 56, 56, 58; T. 42, 48, 44, 35, 45, 43, 49, 41, 46, 48, 47, —, —; Ts. 21, 20, 21, 19, 19.5, 21, 23, 20, 19, 20, 20, —, —; B. f. g. 16, 16, 18, 15, 16.5, 17.5, 17, 16.5, 17, 16, 16.5, —, — mm.

(The measurements of the Banguey birds are given last.)

A proportion of these North Bornean birds, especially those from Banguey Island, are noticeably of a paler rufous on mantle and wings than the majority of a series from Sarawak, but there is a good deal of variation in this respect in almost any one place. All are very different from the bird from Sampit, South Coast of Borneo, recently named by us *C. e. rufa**. Northern birds are palest above while those of the south are the most richly coloured.

Collin and Hartert (l. c. s.) have named Labuan Island birds *Cyanoderma labuanensis* nom. nov., on the grounds that *Timalia bicolor* Blyth (Ibis, 1865, p. 46) is antedated by a name of Lafresnaye, but (Mr. H. C. Robinson informs us) reference to the latter (Mag. de Zool., 1835, pl. xxxix, text) shows that his combination "Tim [alie] bicolor" is French and not binomial.

Timalia bicolor was described without provenance,† but in renaming it *Cyanoderma labuanensis*, Coll. and Hart., seem to have supplied a type locality. The island of Labuan is geographically intermediate between Banguey Island and the parts of Sarawak whence came our examples and *C. e. bicolor* must be taken to include all of them. Had Labuan birds not been named, but not otherwise, it would perhaps have been legitimate to distinguish one form from the extreme north of Borneo and another from the latitude of Southern Sarawak.

Not known from the Philippines.

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*Bull. B. O. C. xlviii, 1927, p. 47.

†"Like *T. erythroptera* nobis, but dark ashy with rufous mantle, wings and tail. Prepared like the Malaccan specimens."

163. Mixornis gularis argentea subsp. nov.

Like *M. g. montana* but greyer and less olive on the upper parts, especially on the head which is practically untinged with rufous. Underparts less heavily striped.

1 ♂, 1 ♀ Mallewalle Island; 6 ♂, 2 ♀ Banguey Island.

"Irides yellow or ochreous; bare skin on head blue; maxilla black; mandible plumbeous; feet leaden or dull olive."

Males.—T. L. 153, 144, 143, 140, 141, 149, —; W. 65, 62, 61, 61, 62, 60, 62; T. 64, 56, 60, 51, 56, 58, —; Ts. 23, 20, 19, 21, 20, 19, 20; B. f. g. 18.5, 19, 18, 18.5, 18, 17, 18 mm.

Females.—T. L. 142, 146, 139; W. 61, 63, 60; T. 56, 55, 56; Ts. 21, 21, 19; B. f. g. 18, 19, 17 mm.

(*The measurements of the type are given first.*)

On description *argentea* is very near *cagayanensis* Guillemard* but it is greyer above and yellower below: *cagayanensis* has the upper parts like *montana* from which it differs in its lightly striped throat and less yellow abdomen (type examined). Sharpe† has already noted that Guillemard's plate is inaccurate.

Type. Adult male collected on Mallewallé Island, North Borneo by C. Boden Kloss and F. N. Chasen on 9th August, 1927.

M. woodi of Palawan is a form of this species.

164. Mixornis gularis montana Sharpe.

Mixornis montana Sharpe, Ibis, 1887, p. 448 (Kina Balu 1000′).

5 ♂, 6 ♀ Samawang River, Kudat, Benoni and Rayoh.

"Iris yellow or ochreous; maxilla black; mandible plumbeous; feet dark olive."

Males.—T. L. 145, 150, 145, 147, 139; W. 62, 54, 64, 65, 63; T. 55, 58, 60, 57, 60; Ts. 22, 20.5, 18, 21, 22; B. f. g. 18, 19, 17, 19, 17 mm.

Females.—T. L. 142, 143, 142, 148, —, —; W. 61, 62, 65, 61, 62, 63; T. 52, 57, 59, 58, —, —; Ts. 20, 22, 22, 22, —, —; B. f. g. 17, 17, 18, 18, —, — mm.

These specimens are intermediate between the pale race of Cagayan Sulu and the North Borneo islands and the more richly coloured *borneensis* which occurs at least as far north as Brunei. They are nearest to *cagayanensis* (of Mallewallé and Banguey Islands)‡ but the upper parts are tinged with chestnut, the crown is never grey and the throat and breast are more heavily streaked.

**Mixornis cagayanensis* Guillemard, Proc. Zool. Soc. Lond., 1885, p. 419, pl. xxv (Cagayan Sulu Island).

†Ibis, 1887, p. 440.

‡Guillemard identified a bird from Abai, north of Jesselton, as *cagayanensis* (P. Z. S., 1885, p. 413), but suggested it might have been wrongly labelled. It is an example of *montana*.

They are at once separable from *borneensis* by reason of the rich chestnut crown and upperparts of the latter. *Mixornis montana,* which came from the low levels of Kina Balu, is tolerably certain to be the form occurring throughout the lowlands of North Borneo. It is curious that Sharpe identified birds from the Bengkoka River (near Kudat) as *borneensis* in the same paper as he recognised *montana* from Kina Balu.* Perhaps he split a variable series on the balance of characters.

165. **Kenopia striata** (Blyth).

9 ♂, 2 ♀ Samawang River and Bettotan; 1 ♀ Rayoh.

"Iris brown; maxilla black; mandible black, base fleshy or grey; feet fleshy."

Males.—T. L. 146, 142, 146, 148, 148, 145, 144, 148, 150; W. 69, 69, 69, 68, 69, 73, 68, 69, 70; T. 55, 55, 54, 53, 53, 55, 50, 50, 56; Ts. 24, 22, 20, 21, 21, 22.5, 22.5, 22, 21; B. f. g. 18, 18, 19, 18, 18, 20, 19, 20, 21 mm.

Females.—T. L. 144, 142, 145; W. 68, 65, 68; T. 52, 50, 55; Ts. 21, 20, 27; B. f. g. 18.5, 18, 20 mm.

Birds from North Borneo, Sarawak, Sumatra and the Malay Peninsula are inseparable.

Not known from the Philippines.

166. **Macronus ptilosus reclusus** Hart.

Macronus ptilosus reclusus Hartert, Bull. B. O. C., xxxvi, 1915, p. 36; Rob. and Kloss, Ibis, 1918, p. 588.

4 ♂, 8 ♀ Bettotan, Kota Belud and Rayoh.

"Iris brown; orbital skin blue; bill black; neck skin blue; feet black."

Males.—T. L. 163, 175, 167, —; W. 74, 73, 67, 75; T. 68, 74, 69, —; Ts. 25, 26, 23, —; B. f. g. 21, 20, 21, — mm.

Females.—T. L. 165, 165, 166, 170, 163, 162, 160, 160; W. 68, 70, 70, 75, 71, 69, 71, 69; T. 67, 65, 69, 70, 68, 65, 67, 63; Ts. 25, 24, 24, 24, 25, 20, 23, 23; B. f. g. 19, 20, 20, 20, 20, 20, 20, 21 mm.

Macronus is not known from Palawan or Sibutu, though it occurs Tawi-tawi Id.

167. **Erpornis xantholeuca brunnescens** Sharpe.

1 ♂ Samawang River.

"Iris dark; maxilla dark brown, edges fleshy; mandible and feet fleshy."

T. L. 120; W. 63; T. 41; Ts. 16; B. f. g. 16 mm.

A good race characterised by the brownish wash on the upper parts: the type came from Sarawak.

Not known from the Philippines.

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*Ibis, 1889, p 416.

TURDIDAE

168. Geocichla interpres interpres (Kuhl in Temm.).

2 ♂ Samawang River and Bettotan.

"Iris dark; bill black; feet fleshy."

Males.—T. L. 170, 164; W. 100, 101; T. 52, 55; Ts. 27, 28; B. f. g. 23, 22 mm.

Robinson and Kloss have commented on the rarity of this species in Malaysia in Journ. Federated Malay States Mus., viii, pt. 2, 1918, p. 206.

Occurs in the Philippines but not recorded from Palawan or Sibutu

169. Enicurus ruficapillus Temm.

2 ♂, 1 ♀ Bettotan.

"Iris dark; bill black; feet pinkish fleshy or fleshy white."

Males.—T. L. 192, 188; W. 90, 87; T. 77, 75; Ts. 30, 29; B. f. g. 25, 27 mm.

Female.—T. L. 178; W. 83; T. 71; Ts. 28; B. f. g. 25 mm.

One of the males has the orbit completely encircled by the black area.

No Forktail is known from the Philippines.

170. Enicurus leschenaulti frontalis Blyth.

2 ♂, 1 ♀ Bettotan.

"Iris dark; bill black; feet fleshy pink, tarsi pale grey."

Males.—T. L. 224, 210; W. 93, 91; T. 99, 93; Ts. 29, 30; B. f. g. 26, 24 mm.

Female.—T. L. 198; W. 86; T. 84; Ts. 29; B. f. g. 24 mm.

171. Copsychus saularis niger Wardlaw Ramsay.

Copsychus niger Wardlaw Ramsay, P. Z. S., 1886, p. 123 (Sandakan).

Copsychus adamsi Elliot, Auk, vii, 1890, p. 348 (neighbourhood of Sandakan).

Copsychus saularis amoenus, Hartert (part.) Nov. Zool., 1910, p. 235.

8 ♂, 5 ♀, 3 juv. Bettotan, Kudat, Benoni; Banguey, Balambangan and Mallewallé Islands.

"Iris dark; bill and feet black."

Males.—T. L. 210, 232, 245, —, 256, 242, 245, 260; W. —, 108, 113, 112, 112, 113, 115, 115; T. —, 100, 112, —, 106, 103, 100, 102; Ts. 31, 30, 30, —, 31.5, 31, 31, 35; B. f. g. 29, 28, 29, —, 29, 29, 34, 34 mm.

Females.—T. L. 211, 222, 228, 230, 228; W. 99?, —, 106 (+), 107, 104; T. 89, 96, 93, 93, 95; Ts. 33, 29, 31, 30.5, 28; B. f. g. 28, 29, 32, 30.5, 29 mm.

The North Bornean males before us are variable. Six have no white on the secondaries, but two show a small amount of white. All have the abdomen black but none has the under tail-coverts entirely so, at least a small fleck of white on some of the feathers being present: nevertheless the under tail-coverts are always much more black than white. The tail is also variable in colour: it ranges from entirely black though specimens in which there are small pale patches, perhaps almost negligible, on the outer pair, or outer two pairs of rectrices to birds in which the first two pairs of rectrices are largely white and even the third pair also marked with white.

All the males have the gloss strongly violet and there are no grounds for separating the series.

None of the females has black on the secondaries; four have the tail quite black and one has a small amount of white on the outer two pairs of rectrices.

* * * * *

Dr. Stresemann* has recently put forward an attempt to demonstrate that the distribution of the white-bellied and black-bellied individuals of *Copsychus* in Java and Borneo is so remarkable that the variations in plumage cannot be correlated with any definite geographical range; that the bird, in fact, cannot be divided into subspecies, and that the ordinary nomenclature of the systematist is not applicable.

As a corollary Dr. Stresemann explains the supposed rather complicated distribution of the two sections by the supposition that the black-bellied birds are mutations of the white-bellied *C. s. musicus* occurring with a varying frequency in different localities and that the tendency in *C. s. musicus* to change the colour of the belly to black has manifested itself in two geographical centres simultaneously.

With a very large series of Malaysian *Copsychus* before us we are not quite in agreement and we feel sure that, in Java and Borneo, there are local forms of this species which, like established geographical races of all other birds, can be interpreted by a diagnosis and a map.

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*Journ. f. Orn lxxii, 1924, 2, pp. 252—255.

The case with *Copsychus saularis* is that in the south-eastern extremity of its range in the Oriental region nigrescence is dominant, especially in Eastern Java, Bali and Eastern Borneo; to a less degree in the Philippines where *C. s. mindanensis* has the tail entirely black.

This is paralleled in the Ethiopian region where *Copsychus* is white-bellied in Western Madagascar and black-bellied on the east side of that island and in the Seychelles.

Most of the difficulties obstructing this view are removed when the following points are made clear:—

I. The North Bornean black-bellied *niger* is not the same as *amoenus* which occurs in the east of Java: the races are quite distinct.

II. It has yet to be proved that truly typical *niger* and *amoenus* occur within the range of any white-bellied form.

III. In the narrow zones (perhaps rather broader in this species than in many others, but not exceptionally so) where the races meet, intermediates occur: these "racial hybrids" are not the result of direct crossing between white and black-bellied forms but they are the inhabitants of an area in which the species is unstable and where gradation is not always regular.

IV. Uncritical early records cannot be used for plotting ranges: *amoenus* of one author is *musicus* of another, entirely on an imperfect knowledge of both forms, the balance of characters, or the personal factor.

V. The white-bellied forms occurring in Sumatra, the Malay Peninsula in the western parts of Borneo and Java are not strictly the same.

VI. The black-bellied birds found in East Java with Bali, East Borneo and North Borneo represent different races.

Excluding certain small island forms and working entirely on the characters of the ADULT MALE the Malaysian races may be expounded as follows:—

Malay Peninsula

The Malay Peninsula is occupied by a white-bellied bird: in none of our series, from North and South, does the wing exceed 105 mm. and in many birds it falls below 100 mm. Malayan birds have more black in the tail and show less white on the axillaries and under wing-coverts than typical *saularis* of Bengal; they are perhaps rather smaller and have the under wing-coverts more broadly margined with white than *musicus* (syn. *ephalus* Oberh.) of Sumatra.

Robinson and Kloss consider that Malayan birds are nearest to *musicus*: Oberholser places them under *andamanensis*. Like Oberholser's *erimelas* and *haliblectus* from North Tenasserim and the Mergui Archipelago* they are of course really intermediates between *saularis* and *musicus* and only possession of exact topotypes of all the described races would make it feasible to employ a precise nomenclature in such cases as this, but for all practical purposes Malayan birds are *C. saularis musicus* > *saularis*.

Sumatra

The Sumatran race is always white-bellied and it differs very slightly from the Malayan bird in having the under wing-coverts perhaps blacker. Adult males measure 101 - 109 mm., once 96 mm. (eleven examples) and *musicus* therefore seems to attain a greater maximum than Malayan birds.

Java

A white-bellied race occurs in the extreme west of Java and a black-bellied race in the extreme east (and in Bali). In colour the West Javan race does not seem to differ from *musicus* except that the males are distinctly darker under the wings. The amount of black on the third rectrix is variable: in the majority of our series it is largely white, but it may be largely black and in one bird the third rectrix is all white and the fourth feathers are also tipped with white: *musicus* exhibits the same variations. This white-bellied Javan bird is small. Our largest specimen in a series of seven has the wing measuring 104 mm. and the bill is usually much smaller than in Malayan birds. For the moment the specimens may be indicated as *C. saularis musicus* > *amoenus* for they are *musicus* in colour and *amoenus* (the next race to be considered) on size.

The largest black-bellied bird we have seen from Java has the wing measuring 104 mm. The race has been named *amoenus* and typically it has the under tail-coverts mixed with white and there are a few white feathers at the sides of the vent. The amount of black on the third rectrix is variable. In a very large area in Java the species is unstable, and inosculation takes place: *C. s. musicus* > *amoenus* occurs together with (*C. s. amoenus*) > (*C. s. musicus* > *amoenus*). White-breasted birds are said to occur as far east as Sourabaya and Kediri, but we have *amoenus* from Karangbolong (on the South coast of Mid Java) and another specimen which is nearer to *amoenus* than to *musicus* from Wynkoops Bay, South-west Java, where *musicus*-like birds are dominant. The intermediate zone is thus very large but we suspect that the Sourabaya birds are slightly mixed in their characters unless it be that *amoenus* spreads to the west along the south coast and the *musicus* form to the east along the north coast of Java*

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*Smithsonian Misc. Coll., 76, No. 6, 1923, pp. 1, 2.

Borneo

Only white-breasted birds (*problematicus* Sharpe) occur in the Kapuas River basin, Southwest Borneo, and in Southern Sarawak: we have specimens before us from both localities. They are large birds (wings up to 109 mm.), very dark on the under wing-coverts and axillaries and with the amount of black on the third rectrix variable as usual. These white-breasted birds extend along the northwest of Borneo towards North Sarawak where they are replaced by birds intermediate between *musicus* and the North Bornean *niger*. Of these intermediates some have the belly largely white and others largely black: some are rather like typical *amoenus* of Java but they run larger than that form. These *C. s. musicus* > *niger* (or the converse) are common in the Baram District, Brunei, Limbang and Lawas and we have seen a dark bird from Belaga on the upper Rejang River. Their wings run up to 110 mm. in length.

The territory of British North Borneo is occupied by *niger*. This is not identical with *amoenus* but differs in the following characters:—

1. Much less white in the tail which is occasionally entirely black.
2. Secondaries only rarely white.
3. Abdomen always black.
4. Under tail-coverts black or more black than white.
5. Large size: wing up to 115 mm.

The tail in *niger* becomes whiter as it passes down the east coast of Borneo where intermediates between *niger* and *amoenus* are found. Two of these from near Samarinda are only separable

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***Gryllivora brevirostra* Swainson, Classification of Birds (2¼ Centenaries), 1837, p. 292.

"Glossy black; chin, throat and breast, lateral tail feathers pure white. Bill small, straight. Inhabits Java............This is probably a female, but the difference in the tail distinguishes it at first sight from the two former" [*i.e.*, Indian birds with the four outer pairs of tail feathers pure white, whereas Javanese birds have, normally, white on the three outer pairs only].

Tweeddale (Ibis 1877, p. 300, footnote) says that Horsfield and Moore in their Catalogue erroneously identified *brevirostris* with *amoenus*, but we think they were right. There is no mention in the description of the Javanese bird of a "body beneath .....pure white" which is recorded of the other two forms of *Copsychus* which precede that of *brevirostris*: and from the omission of such a feature the inference indicated by the context is that Swainson was dealing with a bird which lacked the white abdomen of the *musicus* section.

from *amoenus* by their rather larger size (wings 107, 109 mm.): they are *C. s. pluto* (Bp.). We have no really authentic information as to the birds occurring in the southwestern corner of Borneo, but examples from Banjermassin and also along the valley of the Barito have been determined as both *amoenus* and *musicus*, as have others from the headwaters of the Mahakkam, or Koetai River. We should probably regard the birds so recorded as intermediate and non-typical. It is unlikely that the true small *amoenus* occurs at all in Borneo. The interior of the island needs special consideration and the distribution of white and black-bellied birds may be directly influenced by the river systems and mountain ranges.

Females

We only have one from West Java: it has the upper parts of a deeper, more glossy black than any we have seen from the Malay Peninsula but both types of female occur together in Southern Sarawak (Kuching) and perhaps our series are unequal. Females of *niger* and *amoenus* are deep glossy black above, therein resembling the males, but they are dark bluish grey below. In *niger* the white on the wings is reduced to a patch on the wing-coverts and the tail is usually quite black. Females from Baram are intermediate. they have the abdomen washed with grey but the whole of the underparts is paler than in topotypical *niger*.

No *Copsychus* has been recorded from Palawan or Sibutu. The Philippine *mindanensis* is white-breasted with an entirely black tail.

SUMMARY: DISTRIBUTION AND FORMS.

Malay Peninsula ...	*Copsychus saularis musicus* > *saularis*, or, fide Oberholser, *C. s. andamanensis*.
Sumatra	*C. s. musicus* (Raffles).
Java:	
i. West ...	*Copsychus saularis javensis* subsp. nov. Type: adult male from Wynkoops Bay, S. W. Java, 18th March, 1920. C. B. K. leg. Total length 227, Tail 98, Wing 100, Tarsus 29, Bill from gape 27 mm. Descr. supra. p. 87.
ii. Mid	*C. s. javensis* > *C. s. amoenus*.
iii. East and Bali ...	*C. s. amoenus* Horsf.

Borneo:

i. East ...	... *C. s. pluto* Bp. Based on birds named by Temminck which must have come from South-eastern, or Eastern-south Borneo. We select as terra typica the neighbourhood of Samarinda.
ii. North	... *C. s. niger* Wardl. Rams.
iii. Between the above two forms ...	*C. s. pluto* > *C. s. niger.*
iv. West:	
a. Brunei and N. Sarawak ...	*C. s. niger* > *C. s. problematicus.*
b. S. Sarawak and W. Borneo ...	*C. s. problematicus* Sharpe. This bird differs from that of the Malay Peninsula and West Java and we have little doubt that it differs from the Sumatran race also.
v. The South-west corner of Borneo	*C. s. problematicus* > *pluto*?
vi. The South-east corner of Borneo	*C. s. pluto* > *problematicus.*

172. Kittacincla stricklandi stricklandi (Motl. and Dillw.)

Guillemard, P. Z. S., 1885, p. 415; Sharpe, Ibis., 1894, p. 540.

14 ♂, 3 ♀ Samawang River, Bettotan and Rayoh; 3 ♂, 2 ♀ Banguey Island; 1 ♂ Balambangan Island.

"Iris dark; bill black; feet fleshy brown."

Males (mainland).—T. L. 235, 250, 255, 237, 226, 242, 260, 257, 240, 248, 233, 242, 240, 250; W. 97, 100, 97, 97, 94, 97, 101, 102, 100, 100, 93, 94, 96, 101; T 117, 128, 125, 114, 108, 120, 136, 132, 115, 123, 105, 117, 113, 126; Ts. 27, 28, 29, 25, 27, 27, 29, —, —, 30, 28, 24, 29, 29; B. f. g. 25, 25, 25, 24, 26, 26, 25, 24, 27, 26, 24, 25.5, 25, 28 mm.

Males (islands).—T. L. 265, 246, 240, 252; W. 106, 97, 96, 103; T. 142, 122, 112, 132; Ts. 26, 28, —, 27; B. f. g. 27, 25, 27, 25.5 mm.

(The measurements of the Balambangan bird are given last).

Females (mainland).—T. L. 232, 232, 212; W. 92, 94, 95; T. 111, 108, 100; Ts. 27, 28, 25; B. f. g. 24, 25, 25 mm.

Females (Banguey)—T. L. 220, 215; W. 94, 95; T. 105, 102; Ts. 25, 28; B. f. g. 23.5, 23 mm.

The island birds seem inseparable from those of the mainland. The amount of black on the fourth pair of tail-feathers is variable: usually most of the inner web is black but the black may be much reduced or, on the other hand, the whole of the inner web and part of the outer web of the feather may be black.

There is very little difference between the sexes: the females have shorter tails, rather less rufous underparts and are slightly less deeply glossy black above but the differences are not striking.

K. stricklandi cannot be considered a subspecies of *K. malabarica* because over a considerable area in northern Sarawak a form of the latter, *K. malabarica suavis*, occurs side by side with *K. stricklandi.*

Though *K. malabarica suavis* (type locality, southern Borneo) is not known in Borneo north of a line drawn between, and including, Labuan Island and Silam in Darvel Bay (north of which only *K. stricklandi* seems to occur) yet to the southwards as far as Central Sarawak in the west and beyond the Dutch boundary to the east both birds are found. Hose* states they occur together on the lower slopes of Mt. Dulit and considers that *stricklandi* is never found south of the River Bintulu which is about half-way between Labuan and Kuching. It is curious that only *suavis* is known from Mts. Mulu† and Kalulong.‡

In the west, *suavis* occurs as far north as Lumbidan, on the coast opposite Labuan Id., but not in Labuan itself: its limits on the east coast are not known but they are somewhere between the Mahakkam River and Darvel Bay.

Bangs and Peters have recently described a most interesting form of *stricklandi* from Maratua Island off the central-east coast of Borneo: it has the tail entirely black.§

Kittacincla nigra of Palawan is another species.

173. **Trichixos pyrropyga** Less.

4 ♂ Samawang River and Bettotan.

"Iris dark; bill black; feet fleshy."

T. L. 218, 213, 205, 225; W. 104, 99, 100, 105; T. 95, 90, 82, 95; Ts. 27, 28, 28, 31; B. f. g. 28, 26, 27, 31 mm.

These birds do not seem to differ from Sumatran topotypes.

Trichixos is not known from the Philippines.

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*Ibis, 1893, p. 384.

†Sharpe, Ibis, 1894, p. 542.

‡Sharpe, Ibis, 1894, p. 421.

§*Kittacincla barbouri*, Occ. Pap. Bost. Soc. Nat. Hist., 5, 1927, p. 230

SYLVIIDAE

174. **Orthotomus atrogularis humphreysi** Chas. and Kloss.

Orthotomus atrogularis humphreysi Chas. and Kloss, Journ. für Ornith., 1929, Band 2, p. 120.

Like *O. a. atrogularis* of the Malay Peninsula but the breast abdomen and under tail-coverts pale lemon yellow.

Type. ♂ ad. Bettotan near Sandakan, British North Borneo, 15th August, 1928.

2 ♂, 3 ♂ Bettotan.

"Iris brown; maxilla blackish; mandible dark fleshy; feet yellowish fleshy; tarsi brown."

Males.—T. L. 116, 105; W. 44, 43; T. 39, 31; Ts. 20, 19; B. f. g. 19, 19 mm.

(*The measurements of the type are given first.*)

Females.—T. L. 107, 108, 115; W. 42, 44, 45; T. 35, 36, 36; Ts. 18, 19, 18; B. f. g. 17, —, 18 mm.

The type has the throat deep black with a small white patch bordering the black posteriorly Females have the chin and throat white but the remainder of the underparts yellow, deepest on the centre of the breast and abdomen as in the males. All are quite distinct from the forms inhabiting the Malay Peninsula and adjacent islands, Sumatra and Sarawak.

As far as we know this race is confined to the north of Borneo: further south occurs *O. a. atrogularis* Temm. with white underparts.

[Named in honour of the Governor of British North Borneo at the time of our visit, His Excellency Mr. J. L. Humphreys, C.M.G.]

No black-throated tailor-bird is known from Palawan or Sibutu.

175. **Orthotomus ruficeps sericeus** Temm.

Orthotomus sericeus Temm., Texte des Pl. Col., livr. 101^e, 1836 (Borneo).

6 ♂, 2 ♀ Bettotan, Kudat and Kayoh; 5 ♂, 1 ♀ Banguey Island; 1 ♂ Balambangan Island.

"Iris brown; maxilla brown; mandible fleshy; feet fleshy, front of tarsi brown."

Males (mainland).—T. L. —, 135, 125, 133, 138, 140; W. 52, 53, 52, 55, 55, 55; T. —, 48, 43, 47, 48, 47; Ts. 23, 22, 22, 22.5, —, 22.5; B. f. g. 20, 19.5, 21, 22, 20, 20 mm.

Females (mainland).—T. L. 132, 122; W. 49, 50; T. 44, 42; Ts. 19, 21; B. f. g. 19, 21 mm.

Males (*islands*: *Balambangan bird given last*).—T. L. 132, 126, 132, 135, 125, 132; W. 51, 48, 52, 55, 51, 55; T. 44, 39, 43, 47, 35, 45; Ts. 23, 20, 23, 23, 21, 24; B. f. g. 20, 20, 20.5, 22, 20, 22 mm.

Female (*Banguey*).—T. L. —; W. 47.5; T. —; Ts. 21; B. f. g. 19 mm.

Birds from Borneo are perhaps rather clearer grey on the upper parts and average whiter and less creamy below than those from Sumatra and the Malay Peninsula. There is much variation in the colour of the crown in this series. *O. r. nuntius* from Cagayan Sulu Island* is said to have the upper parts even clearer grey than the Bornean bird.

O. r. nuntius Palawan and Cagayan Sulu.

176. Orthotomus sepium borneoensis Salvad.

4 ♂, 3 ♀ Bettotan, Kudat and Rayoh; 1 ♂ imm., 1 ♀ Banguey Island; 1 ♂ imm. Balambangan Island.

"Iris brown or grey-brown; maxilla black or brown; mandible brown, base fleshy; feet yellowish flesh; tarsi brown."

Males (*adult*).—T. L. 123, 122, 119, 128; W. 47, 46, 49, 49, T. 44, 40, 42, 50; Ts. 19.5, 21, —, —; B. f. g. 19, 19, 18, 19 mm.

Females (*island birds last*).—T. L. 111, 115, 115, 115, 115; W. 44, 42, 44, 43, 44; T. 36, 35, 37, 36, 39; Ts. 19, 20, —, —, 19; B. f. g. —, —, 18, 18, 16 mm.

Adult males from Sarawak and North Borneo are perhaps rather purer grey above and have less white on the abdomen than *cineraceus* Blyth, of the Malay Peninsula and Sumatra but we have only maintaind *borneoensis* after a certain amount of hesitation.

"*O. cineraceus*" is recorded from Cagayan Sulu: it is of course either *borneoensis* or an undescribed form.

177. Phylloscopus borealis borealis (Blas.).

1 ♀ Banguey Island.

"Iris dark; maxilla blackish; mandible yellow, tip blackish; feet dull yellowish brown."

T. L. 124; W. 62; T. 46; Ts. 29; B. f. g 15.5 mm

Recorded from Palawan.

178. Prinia flaviventris superciliaris Salvad.

2 ♂, 5 ♀, 2 ?, 2 imm. ex. Bettotan and Rayoh.

♂. "Iris brown; bill black; feet ochreous or brownish fleshy."

♀. "Iris brown; maxilla black; mandible black; base fleshy; feet yellowish fleshy."

**Orthotomus ruficeps nuntius* Bangs, Bull Mus. Comp. Zool , lxv, 1922, p. 82.

Males.—T. L. 129, 133; W. 46.5, 46; T. 57, 57; Ts. 21, 21; B. f. g. 16.5, 18 mm.

Females.—T. L. 128, 130, 129, 127, 138; W. 43, 45, 46, 44, 45; T. 54, 52, 54, 53; Ts. 21, 21, 20, 21.5; B. f. g. 16.5, 15, 16, 17, 16.5 mm.

Siebers* has pointed out that the eggs and song of the two birds, *flaviventris* and *blythi* (a form of *inornata*) are different and that *superciliaris* is, on account of both these characters, plus the absence of any extent of black in the tail and the weak rictal bristles, the Bornean form of the yellow-breasted *flaviventris* and not of *inornata* as recently suggested by Kloss.†

There seems little advantage in recognising such an artificial genus as *Burnesia*.

Not known from the Philippines.

LANIIDAE

179. **Hemipus hirundinaceus** (Temm.).

6 ♂, 3 ♀, 2 imm. ♂ Bettotan; 1 ♂, 1 ♀ Banguey Id.

♂. "Iris dark; bill and feet black."

♀. "Maxilla black; mandible black, base whitish."

Males (adult).—T. L. 133, 128, 136, 140, 133, 131, 136; W. 62, 65, 63, 65, 63, 62, 66; T. 52, 50, 52, 52, 51, 49, 52; Ts. 14, 13, 12.5, 13, —, 13, 13; B. f. g. 21, 19, 20, 10.5, 19, 19, 19.5 mm.

Females.—T. L. 137, 137, 132, 145; W. 64, 62, 61, 67; T. 53, 52, 48, 56; Ts. 13, 13, 13, 13; B. f. g. 20, 20, 20, 20 mm.

Not known from the Philippines.

180. **Tephrodornis gularis frenatus** Büttikofer.

Tephrodornis frenatus, Büttikofer, Notes Leyd. Mus., ix, 1887, p. 53 (Borneo); op. cit., xxi, 1900, p. 208.

1 ♀, 3 ♀ Bettotan.

"Iris dark; bill black; feet black or dark plumbeous."

Male.—T. L. 190; W. 100; T. 68; Ts. 21; B. f. g. 28 mm.

Females.—T. L. 180, 187, 180; W. 99, 96, 96; T. 68, 68, 61; Ts. 19, 19, 18; B. f. g. 30, 28, 30 mm.

Büttikofer separated Bornean birds from *gularis* of West Sumatra on account of the large bill, rather darker grey upperparts and all-black tail-coverts and tail of the male of the former, but withdrew the name in 1900 (l. c. s.).

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*Treubia, x, 1928, p. 391.

†Jaarber. Club, v. Nederl. Vogelk., 17 (? 3), 1928, p. 116.

The birds before us show that his later action was not justified. The females are also rather darker above and less brown on the mantle than most birds from East Sumatra and the southern part of the Malay Peninsula which are *T. p. fretensis* Rob. and Kloss.*

Not known from the Philippines.

181. Platylophus galericulatus lemprieri Nicholson.

Platylophus lemprieri Nicholson, Ibis, 1883, p. 88 (Segaliud River, Sandakan Bay, N. E. Borneo).

5 ♂, 5 ♀ Samawang River and Bettotan.

"Iris brown; bill black or greyish black (mandible sometimes with brownish base); feet plumbeous."

Males.—T. L. 264, 260, 271, 258, 253; W. 135, 131, 137, 128, 128, T. 119, 112, 116, 105, 109; Ts. 32, 32, 31, 32, 29; B. f. g. 32, 35, 34, 32, 31 mm.

Females.—T. L. 262, 255, 248, 250, 264; W. 129, 125, 128, 124, 130; T. 114, 112, 109, 101, 114; Ts. 31, 27, 29, 31, 29; B. f. g. 34, 33, 32, 31, 33 mm

The above series is variable in colour, some birds being darker (chocolate brown) than others which are more yellowish brown. The differences appear to be mainly individual for there is nothing to indicate that the paler birds are younger than the others. Our Sumatran material (*P. g. coronatus*) consists of nine specimens. These are darker than the darkest of the North Bornean birds and we do not believe that Sumatra could produce such a pallid series as that before us. We therefore recognise *lemprieri* for the North Bornean race. Birds from Sarawak are unstable some are inseparable from *coronatus* and others from some, but not the palest, of our topotypes of *lemprieri*.

The amount of black on the cheeks is too variable to be used as a racial character.

Not known from the Philippines.

SITTIDAE

182. Sitta frontalis corallipes Sharpe.

1 ♂, 1 ♀ Rayoh.

"Iris yellow; bill and feet red."

Male.—T. L. 128; W. 70; T. 38; Ts. —; B. f. g. 18 mm.

Female.—T. L. 120; W. 68; T. 40; Ts. —; B. f. g. 18 mm.

Like specimens from Sarawak. *Sitta frontalis palawana* Hartert, from Balabac and Palawan Islands differs very little from this race: the feet are "light brown".

Palawan: *S. f. palawana.*

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*Journ. Straits Branch Roy. Asiat. Soc., No. 81, 1920, p. 109.

CORVIDAE

183. Platysmurus leucopterus aterrimus (Temm.).

1 ♂, 3 ♀, 1 imm. ♂ Bettotan.

"Iris red; bill and feet black."

Male.—T. L. 365; W. 174; T. 170; Ts. 37; B. f. g. 39 mm.

Females.—T. L. 368, 360, 370; W. 178, 176, 183; T. 180, 170, 170; Ts. 34, 36, 37; B. f. g. 36, 36, 36 mm.

The immature bird is almost full grown (wing 167 mm.) but like the adults it is glossy black. The feathers of the crown and forehead are also modified, although not so noticeably as in the adults.

Not known from the Philippines.

DICRURIDAE

184. Chaptia ænea malayensis Hay.

2 ♂ Bettotan.

"Iris dark; bill and feet black."

T. L. 215, 209; W. 108, 111; T. 100, 90; Ts. 15.5, 17; B. f. g. 24, 23 mm.

The type locality of *Chaptia malayensis* is Malacca and birds from the State of Selangor southwards in the Peninsula have a wing-range of 104 - 116 mm. which fairly represents a dimensional race (*i.e.* minimum length, plus about ten per cent for the maximum length). Robinson and Kloss* are therefore probably in error in recognising a Sumatran race (*Edolius picinus* Bp. "Minimus"), as a series of fifteen adults from that island have wings 105 - 115 mm., and one adult female 100 mm. only. Bornean birds (wings 107 - 112) agree with *C. a. malayensis*.

C. a. ænea, accepting Baker's distribution for the typical race (Mussoorie, N. W. India to Hainan) has, as his large series of measurements shows, a wing-range of 115 - 132 mm.† In this form can be placed birds of South Annam and Cochin China (eight adults wings 118 - 124, and one example from Saigon, 132 mm.). But birds from localities between the Malay States and Yunnan, and those from Burma and Peninsular India, have wings of 107 - 127 mm. (Malay Peninsula and Siam, 110 - 127, Burma 111 - 124, India 107 - 122). It may be possible to allocate series of these to one or other of the above races without violence to distribution: the remainder should be recorded as *C. ænea* > *malayensis* for there is no justification for regarding them as distinct.

Not known from the Philippines.

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*Journ. Fed. Malay States Mus., xi, 1924, p. 322.

†Nov. Zool., xxv, 1918, p. 303.

185. **Dissemurus paradiseus brachyphorus** (Bp.).

Edolius brachyphorus Bp., Consp. Av., 1, 1850, p. 351 (Southern Borneo).

Dicrurus annectens subsp. Kuroda, Tori, iv, 1925, p. 4 (specimen examined).

Dissemurus paradiseus insularis Hachisuka, Bull. B. O. C., xlvii, 1926, p. 58 (Sarawak).

17 ♂, 7 ♀ Samawang River, Bettotan and Rayoh.

"Irides red or brown; bill and feet black."

Males.—T. L. (*excluding racquets*) 272, 278, 282, 270, 254, 250, 260, 286, 262, 275, 280, 277, 278 mm.; T. (*excluding racquets*) 127, 130, 135, 120, 123, 115, 115, 140, 120, 126, 126, 124, 124; W. 131, 140, 140, 134, 130, 139, 131, 133, —, 139, 140, 137, 134; Ts. 21, 22, 21, 22, 20, —, 23, 22, 20, 20, 23, 23, —; B. f. g. 32, 31, 34, 33, 29, 33, 31, 32, 34, 34, 35, 34 mm.

Females.—T. L. (*excluding racquets*) 269, 258, 272, 282, 252, 278, 233; T. (*excluding racquets*) 122, 120, 121, 125, 120, 135, —; W. 127, 127, 141, 136, 132, 132, 131; Ts. 21, 21, 21, —, —, —, —; B. f. g. 32, 33, 31, 32, 33, 34, — mm.

In one bird the racquet extends about 180 mm. beyond the end of the closed tail but in most of the series it is much shorter. The North Borneo birds agree with a series of thirty-six Sarawak examples in having wings of 127 - 141 mm.; but we have seven Sarawak skins with wings 142 - 145 and one 150 mm. An exact topotype of *brachyphorus* has the wing 139 mm.

No form of this species occurs in the Philippines.

186. **Dissemurus paradiseus banguey** Chas. and Kloss.

Dissemurus paradiseus banguey Chasen and Kloss, Journ. für Ornith., 1929, Band 2, p. 120.

Like examples of *D. p. brachyphorus* from Sarawak and North Borneo but larger. wings 146 - 158 mm. against 127 - 145 (once 150 mm.) in seventy specimens of *brachyphorus.*

Type. ♂ ad. Banguey Island, North Borneo, 3rd Sept., 1927.

4 ♂, 1 ♀ Banguey Island; 5 ♂, 1 ♀ Balambangan Island.

"Iris brown or red; bill and feet black."

Males (Banguey).—T. L. 313, 303, 294, 290; W. 158, 152, 152, 152; T. 144, 144, 137, 130; Ts. 23, 24, 22, 25; B. f. g. 35, 36, 33, 35 mm.

(*The measurements of the type are given first.*)

Female.—T. L. 282; W. —; T. 128; Ts. 23; B. f. g. 35 mm.

Males (*Balambangan*).—T. L. 305, 286, 290, 298, 300; W. 153, 148, 147, 146, 147; T. 147, 128, 131, 132, 143; Ts. 23, 24, 24, 24, 24; B. f. g. 37, 37·5, 35, 37, 36 mm.

Female (*Balambangan*).—T. L. 292; W. 148; T. 142; Ts. 23.5; B. f. g. 34 mm.

Like *brachyphorus* this form is practically crestless. In the type the racquets extend 200 mm. beyond the end of the closed tail, but in one male from Balambangan they extend to 258 mm.

ORIOLIDAE

187. **Oriolus xanthonotus consobrinus** Wardlaw Ramsay.

Oriolus consobrinus Wardlaw Ramsay, P. Z. S., 1879, p. 709 (Sandakan, North Borneo).

Oriolus xanthonotus consobrinus Meinertzhagen, Ibis, 1923, p. 83.

14 ♂, 8 ♀ Bettotan, Kudat and Rayoh.

2 ♂, 1 ♀ Banguey Island; 1 ♂ Mallewalle Island.

"Iris red; bill reddish brown; feet plumbeous or blackish."

Males.—T. L. 193, 210, 212, 187, 200, 205, 200, 206, 198, 205, 205, 207, 208, 205; W. 107, 114, 118, 114, 116, 110, 107, 111, 114, 113, 114, 120, 111, 115; T. 59, 78, 79, 48, 71, 78, 66, 66, 75, 75, 78, 80, 77, 75; Ts. 21, 21, 22, 22, 21, 20, 22, 21, —, 22, 21, 22, 24, —; B. f. g. 28, 29, 28, 24, 29, 29, 29, 28, 28, 29, 29, 28, 29, 29 mm.

Males (*Islands*: *Mallewalle last*).—T. L. 210, 210, 195; W. 112, 115, 117; T. 78, 77, 56; Ts. 20, 22, 21; B. f. g. 28, 30, 28 mm.

Females.—T. L. 198, 193, 196, 207, 193, 190, 193, 198; W. 106, 100, 105, 105, 107, 104, —, 105; T. 68, 74, 70, 71, 66, 70, 65, 77; Ts. 22, 21, 20, 20, 20, 19, 23, 22; B. f. g. 28, 28, 27, 27, 29,—, 29, 28 mm.

Female (*Banguey*).—T. L. 203; W. 113; T. 23; Ts. 22.5; B. f. g. 28 mm.

Males of *consobrinus* are separable from males of typical *xanthonotus* of Java, and of Sumatra, the Malay Peninsula and Sarawak by their less bright yellow, more greenish upper parts, larger yellow areas on the rectrices and, as a series, by more yellow on the inner secondaries.

Females of *consobrinus* have the throat and breast suffused with dark grey, the underparts almost as heavily marked as in the male; the mantle, etc., as in the male, but scarcely so yellow or bright, and the crown and nape darker than the mantle. In one specimen the upper side of the head is almost black with a few pale streaks; in others it is largely green with broad, dark streaks and in yet others blackish streaked with green. In all cases the crown and nape are sufficiently dark to form a distinct cap. The sides of the head and neck are dusky, always washed with green.

The original description of *consobrinus* is scarcely applicable to any of our specimens: Meinertzhagen (l. c. s.) says the type is immature. The yellow brown edges to the wing-coverts in this species are of course a sign of immaturity. None of the skins before us has the primaries margined and tipped with greenish yellow and in all the rump is concolorous with the yellowish green mantle or perhaps rather brighter: nor is the undersurface a much purer white than in *xanthonotus*.

The adult female from Banguey differs from all the other females in having the top of the head grey with darker streaks, the ear-coverts grey (both these regions unsullied by green), the throat and breast whiter, and the under tail-coverts rather paler. It may represent a distinct race but in view of the variability of the female of *consobrinus* we do not care to describe it.

Our topotypical males of *xanthonotus* have the wings measuring 110 - 115 mm. and in the Malay Peninsula the range runs up to 118 mm.: *consobrinus* is therefore little, if any, larger than *xanthonotus*.

Meinertzhagen (l. c. s.) says "Birds from the remainder of Borneo [*i.e.*, elsewhere than the North-east and Banguey] are usually this race [*consobrinus*] but not rarely should be referred to *O. x. xanthonotus*"; and again under *O. x. xanthonotus* "In Borneo, especially in the west, birds tend to resemble this race, though the majority belong to *O. x. consobrinus*."

All our birds from Sarawak are quite definitely not *consobrinus* nor are birds from Central East Borneo and we have no doubt that the two forms have a definite range in the island, *consobrinus* occupying only the northern part.

No form of this Oriole occurs in the Celebes and we suggest that the "Bangay" of Meinertzhagen is the island we have visited off the north coast of Borneo and not the Banggai Island, east of Celebes.

[In "Tori", iv, 1925, p. 3, Dr. Nagamichi Kuroda described an Oriole from Tawao in British North Borneo as *O. xanthornus tanakae*. As no form of *O. xanthornus* has previously been found in the Malaysian Islands, it being purely a continental species, this is an important discovery.]

This form also occurs in Palawan (syn. *persuasus* Bangs).

ARTAMIDAE

188. Artamus leucoryn leucoryn (Linn.).

2 ♂, 1 ♀ Banguey Island; 1 ♂, 2 ♀ Balambangan Island.

"Iris dark; bill plumbeous blue, tip black; feet greyish-black."

Males.—T. L. 195, 188, 195; W. *130, 134, 135;* T. 62, 62, 63; Ts. 17, 18.5, 18; B. f. g. 28, 25, 25 mm.

Females.—T. L. 197, 202, 195; W. *131*, 137, 138; T. 67, 68, 64, Ts. 18, 18, 18; B. f. g. 26.5, 26, 27 mm.

(*The measurements of the Banguey birds are given first and when the figure is in italics the measurement possibly does not represent the full development of the wing.*)

When Stresemann reviewed the forms of *A. leucoryn** he temporarily associated birds from Borneo and the Natunas with the typical Philippine race; but with only four specimens from the Natuna Islands before him suggested that the birds of that group might belong to another form distinguished by a greyer, less brown back, though similarly coloured individuals also occurred in the Philippines. We have seven skins from the Natuna Islands which confirm Stresemann's remarks: they differ as noted from a markedly brown-backed series from North Sarawak, Labuan Id., British North Borneo and the Mantanani Islands, which we regard as *A. l. leucoryn.*

The skins from Banguey and Balambangan are like those of the Natunas, but all these were collected in September and have just completed a moult—a few brownish feathers in the mantle and wings of two of three specimens representing the old plumage. The individuals of the other series, all brown-backed, happen to have been taken in June in plumage eight months old.

We think these are the reasons for the differences noted and that no new form need be recognised.

Also known from Palawan.

STURNIDAE

189. Gracula javana javana (Cuv.).

1 ♂ Bettotan.

"Iris dark; wattles deep yellow; bill reddish orange, tip yellow; feet lemon yellow."

T. L. 323; W. 170; T. 90; Ts. 40; B. f. g. 43 mm.

Occurs in Palawan as *G. j. palawanensis.*

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*Nov. Zool., xx, 1913, p. 289.

190. Aplonis panayensis strigatus > heterochlorus.

1 ♂, 1 ♀ subad., Benoni near Jesselton.

2 ♂, 1 ♀, Labuan Island.

3 ♂, Anglo-Dutch Boundary, East Coast.

Wings; Benoni ♂ 101, ♀ 97 mm.
Labuan ♂ 101, 102, ♀ 98 mm.
Boundary ♂ 96, 98, 99 mm.

These examples, though within the wing range of *A. p. strigatus* (89 - 102 mm.) are some of them developing heavier bills, thus tending towards *heterochlorus.*

They are not, however, worth separation from *A. p. strigatus* which occupies the whole of Borneo except the north: they are variable intermediates. Birds from the neighbourhood of Samarinda on the east coast have been named *eustathis* by Oberholser (Journ. Wash. Acad. Sci. 16, 1926, p. 516) but examples seen by one of us from Netherlands Central East Borneo are inseparable from Javanese birds, as are a series from Sarawak.

191. Aplonis panayensis heterochlorus (Oberh.)

Lamprocorax panayensis heterochlorus Oberholser, Bull. U. S. Nat. Mus., 98, 1917, p. 57 (Anamba Islands).

2 ♂ ad., 1 ♂ imm. 2 ♀ ad., Banguey Island.

2 ♂ ad., 1 ♂ imm., 2 ♀ ad. Balambangan Island.

"Iris scarlet; bill and feet black."

Males (Banguey).—T. L. 205, 212, 217; W. 103, 105, 108; T. 66, 71, 68; Ts. 22, 23, 23; B. f. g. 26, 27, 28.5 mm.

Females (Banguey).—T. L. 206; W. 102, 103; T. 67; Ts. 24; B. f. g. 27 mm.

Males (Balambangan).—T. L. 218, 203; W. 109, 106; T. 71 64; Ts. 26, 22.5; B. f. g. 28, 28 mm.

Female (Balambangan).—T. L. 207; W. 104; T. 64; Ts. 23; B. f. g. 27.5 mm.

Stresemann uses *Aplonis panayensis strigatus > affinis >< panayensis* to cover N. W. Borneo and the Natuna Islands* and we consider that the range of this section of large-winged, heavy-billed birds that differ from typical *panayensis* in colour (fide Oberholser) though about the same in size can be extended to include the Tioman Archipelago, the Natuna and Tambelan Islands, Mantanani Island, Banguey and Balambangan Islands. A survey of our very large series inclines us to the belief that within the Malaysian subregion there is little, if any, variation in the gloss of the plumage that cannot be accounted for by age, season and abrasion.

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*Nov. Zool., xx, 1913, p. 376.

Typical *panayensis* occurs in Balabac, Palawan, Sibutu and Tawi Tawi (fide McGregor)

PLOCEIDAE

192. **Munia atricapilla jagori** Martens.

1 ♂ Kabayo.

3 ♂ ad., 1 ♀ imm. Kudat.

1 ♂ Labuan Island.

"Iris brown; bill pale greyish blue; feet slaty blue."

Males.—T. L. 119, 114, 114; W. 52, 52, 52, 54, 54; T. 36, 38, 39; Ts. 16.5, 16, 16; B. f. g. 11, 12, 12 mm.

These birds have a well-defined black abdominal patch (not, or narrowly separated from the black breast) black vent, under tail-coverts and thighs. The head and breast are less intensely jet black than a Malaysian series. Two long-collected skins from Sarawak have head and foreneck rather browner but all are within the range of variation shown by the only two Philippine skins we possess. Two examples from Celebes (*brunneiceps* Walden) are also inseparable.

The immature bird listed is rather more richly coloured than some in a similar stage from Singapore.

Of North Bornean birds it is reported by Kuroda (Tori, iv, No. 19, 1925, p. 1) that they gather in flocks of more than 10,000 individuals and completely destroy rice fields in a single morning.

Balabac, Palawan and the Philippines in general

193. **Munia fuscans** (Cass.).

8 ♂, 8 ♀, 1 ♂ imm. Bettotan, Kudat and Rayoh.

1 sex? Banguey Island.

"Iris brown; maxilla black; mandible grey; feet plumbeous."

Males.—T. L. 112, 114, 111, 112, 108, 110, 110, 111; W. 48, 48, 51, 50, 50, 50, 49, 51; T. 37, 41, 41, 38, 40, 41, 41, 43; Ts. 13, 14, 14.5, 14, —, 13.5, 13, 13; B. f. g. 9.5, 11, 11.5, 11, 10, 11, 9, 10 mm.

Females.—T. L. 112 122, 113, 114, 107, 110, 110, 113; W. 51, 49, 50, 50, 50, 51, 49, 49; T. 39, 44, 41, 42, 39, 37, 42, 40; Ts. 13.5, —, 14, 14, —, 14.5, —, 14; B. f. g. 11.5, 12, —, 11.5, 11, 10, 12, 10 mm.

The Banguey bird has the wing measuring 50 mm. The sexes are exactly alike in plumage. The immature bird is very like the adults but rather more uniform in colour and paler (browner) on the abdomen where there is a faint indication of transverse barring.

The species does not occur is the Philippines except on Cagayan Sulu.

NECTARINIIDAE

194. Aethopyga siparaja siparaja (Raffles).

Aethopyga eupogon Cab., Mus. Hein., 1, 1880, p. 103.

5 ♂ ad., 1 ♂ imm. Kudat, Rayoh and Bengkoka River; 1 ♂, 1 ♀ Banguey Island.

"Iris dark; maxilla black; mandible brown; feet black."

Males.—T. L. 115, 112, 111, 114, 110, 105; W. 51, 50.5, 50, 52, 50, 48; T. 45, 43, 44, 46, 40, 37; Ts. 16, 13, 13, 13, 15, 13; B. f. g. 19, 17.5, 17, 18.5, 18, 16 mm.

(*The measurements of the Banguey bird are given last.*)

Female.—T. L. 99; W. 45; T. 32; B. f. g. 16 mm.

In spite of our extensive material we cannot separate these specimens and fresh skins from the south of the Malay Peninsula, Sumatra and Borneo.

Guillemard* mentions an immature male from Banguey with "feet and tarsus coral-red." The specimens we obtained on the island differ in no way from those of the mainland. Perhaps the field-notes of this sunbird were confused with those of the ground-pigeon (*Chalcophaps indica*) also obtained by Guillemard on the island.

This species does not occur in Palawan or Sibutu.

195. Leptocoma brasiliana brasiliana (Gm.).

2 ♂ Bettotan.

"Iris dark; bill and feet black."

T. L. 88, 93; W. 48, 48; T. 19, 27; Ts. 12, 13; B. f. g. 17, 18 mm.

One bird is moulting on the head but the other has the glossy crown rather darker and greener (less golden) than any of our long series from elsewhere with the exception of a male from a small island near Singapore. The colour of the abdomen in this species is too variable to be used as a racial character.

L. speratus which is found in Palawan may perhaps be regarded as a representative form but it is rather distinct.

196. Leptocomà jugularis ornata (Less.).

4 ♂, 2 ♀ Kudat and Bengkoka River; 1 ♂ Balambangan Island.

"Iris brown; bill and feet black."

Males.—T. L. 112, 111, 110, 110, 115; W. 52, 50, 50, 51, 51; T. 32, 33, 32, 30, 36; Ts. 15, 15, 14, 13, 14 5; B. f. g. 19.5, 20, 19, 20, 20.5 mm.

(*The measurements of the Balambangan bird are given last.*)

Female.—T. L. 115; W. 51; T. 36; Ts. 14.5; B. f. g. 20.5 mm.

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*P. Z S., 1885, p. 410.

The only difference we can discover between these birds and a series of *ornata* from Java is that the former have the bill averaging scarcely perceptibly larger but the distinction is too fine. The name *Cinnyris ornata heliomanis* Oberholser,* based on colour distinctions, has been proposed for East Bornean birds. In our opinion birds from Java, Sumatra, the Rhio-Lingga Islands, the Malay States, islands of the South China Sea and Borneo are inseparable.

Typical *jugularis* has been recorded from Sibutu and *aurora* of Palawan is a form of it.

197. Anthreptes macularia hypogrammica (S. Müll.).

Anthreptes hypogrammica intensior Hartert, Bull. B. O. C., xxxviii, 1917, p. 27 (Sarawak); Robinson and Kloss, Ibis, 1918, p. 592.

7 ♂, 3 ♀ Samawang River, Bettotan and Rayoh.

"Iris dark; bill black; feet olive."

Males.—T. L. 142, 137, 145, 143, 147, 143, 138; W. 67, 66, 66, 67, 68, 66, 70; T. 48, 49, 49, 48, 55, 46, 48; Ts. —, 17, 17.5, 16, 17, 16.5, —; B. f. g. 24, 25, 22, 24, 24, 26, 25 mm.

Females—T. L. 138, 145, 140; W. 60, 63, 63; T. 45, 50, 46: Ts. 16, 18, 17; B. f. g. 23, 25, 24 mm.

Bornean and Sumatran birds are alike and Müller placed both under *hypogrammica* for which Hartert has selected Sumatra as terra typica. They differ from typical birds in being more intensely yellow beneath especially on throat and breast where the Malayan bird generally has the edges of the feathers whitish. In the considerable series before us some birds of each race have the characters of the other, but the series are sufficiently distinct to bear different names.

The species is not known from the Philippines.

198. Anthreptes simplex (S. Mull.).

Nectarinia simplex Sal. Müller, Nat. Gesch. Land-en-Volkenk., 1843, p. 173 (Sumatra).

Anthreptes simplex simplicior Oberh., Journ. Wash. Acad. Sci., 13, 1923, p. 229 (Central Borneo).

Anthreptes simplex frontalis (part.), Rob. and Kloss, Journ. Nat. Hist. Soc. Siam, v, 1924, p. 380.

7 ♂, 8 ♀ Samawang River, Bettotan and Rayoh.

"Iris red; bill black; feet olive-green."

"Iris dark; maxilla brown; mandible yellow tipped with brown; angle of mouth yellow; feet yellow, tarsi olive-brown." (immature).

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*Journ. Wash Acad. Sci., 13, 1923, p. 231.

Males.—T. L. 133, 117, 130, 117, 125, 125, 108; W. 60, 61, 59, 60, 60, 62, 56 (imm.); T. 49, —, 50, 46, 51, 48, —; Ts. 15.5, 15, 15.5, —, —, —, 15; B. f. g. 17, 16, 18.5, 17, 17, 18, 15 mm.

Females.—T. L. 110, 115, 116, 115, 117, 118, 117, 115; W. 55, 55, 57, 52, 57, 55, 57, 55; T. 40, 43, 41, 45, 40, 43, 41, 45; Ts. 15, —, —, —, 14, —, 16, —; B. f. g. 16.5, 16, 16, 16, 16, 16, 16.5, 16 mm.

In size this species appears to be fairly constant throughout its range and although attempts have been made to base races on colour distinctions such a large amount of "bleaching" takes place that we now very much doubt if any subspecies can be upheld.

Oberholser described the Bornean bird as *simplicior* (l. c. s.) on account of its greyer underparts but Robinson and Kloss (l. c. s.) considered that it agreed with birds from the Malay Peninsula in being yellower, and less grey, below than typical *simplex* of Sumatra!

On account of these contradictory opinions we have carefully reviewed the whole of our material and have come to the conclusion that birds from Sumatra, the Malay Peninsula and Borneo are not really separable. The differences in colour that do seem to exist when series are compared one with another are entirely dependent on the different periods that have elapsed since the last moult together with the environment of the birds in life: birds in worn plumage may be almost entirely grey below with but just a tinge of yellow on the middle of the abdomen while newly moulted birds are much yellower and sometimes the whole of the underparts from bill to tail are washed with colour.

Not known from the Philippines.

199. Anthreptes malaccensis bornensis Riley.

Anthreptes malaccensis bornensis Riley, Proc. Biol. Soc. Wash., 33, 1920, p. 55 (Sandakan).

21 ♂ ad., 11 ♂ imm., 18 ♀ Kudat, Benoni, Jesselton Rayoh, Bengkoka River, Banguey, Balambangan and Mallewalle Islands.

"Iris crimson; bill black; feet olive, soles yellowish."

Adult Males (Mainland).—T. L. 120, 127, 122, 130, 125, 134, 143, 140, 132, 135, 127; W. 67, 64, —, 65, 67, 65, 67, 70, 68, 66, 67; T. 35, 40, 40, 46, 47, 45, 50, 52, 48, 46, 44; Ts. 19, 19, 19, 19, 18, 18, 20, 17, 16, 19, 19; B. f. g. 22, 20, 18, 20, 19, 20, 20, 20, 19, 20, 20 mm.

Adult Males (Islands).—T. L. 140, 143, 138, 142, 142, 133, 141, 137; W. 67, 71, 67, 70, 71.5, 65, 72, 69; T. 48, 50, 48, 51, 50, 45, 52, 48; Ts. 18.5, 18, 17, 17, 18, 16, 18.5, 17; B. f. g. 21, 21.5, 21, 21, 22, 21, 21, 20.5 mm.

Females (Mainland).—T. L. 123, 128, 126, 125, 125, 125, 127, 126, 120, 127, 125; W. 61, 62, 62.5, 61, 62.5, 62, 63, 65, 63, 63, 65.5, 63; T. 39, 44, 41, 43, 41, 41, 42, 45, 42, 42, 43, 42; Ts. 18, 18, 17.5, 16, 18, 18, 17.5, 16, 18, 18, 17.5, 18, 16, 16.5, 19, 16; B. f. g. 20, 21, 18.5, 18, 19, 19, 19, 19, 18, 19.5, 17, 19 mm.

Females (Islands).—T. L. 127, 129, 130, 133, 132; W. 62, 64, 64, 65, 66; T. 44, 41, 42, 45, 46; Ts. 17.5, 15, 16.5, 18, 16.5; B. f. g. 19, 19, 20, 20, 20 mm.

After reviewing our very considerable series of this species from various localities we accept *bornensis* because all our specimens from British North Borneo and Brunei do possess all, or most of the characters of brighter colour given by Riley. In the Malay Peninsula, however, a large proportion of skins are quite inseparable from the more richly coloured *bornensis*. Examples from Labuan and Sarawak are intermediate, or else are definitely the duller birds which Riley regards as *malaccensis*. Birds from East Central and South Borneo are also the last.

The differences in plumage among young males and females from any one locality are so great that only conclusions based on extensive material and an understanding of the moults are of value.

Juveniles of both sexes are indistinguishable. Some males moult at once from their immature yellow plumage into the adult metallic dress, but others continue to wear their first plumage well into their second year, by which time they are almost grey on the upperparts and very worn.

Bright yellowish-green (newly moulted) females can be collected side by side with birds in which the crown and mantle are so worn that they are without trace of colour.

Excluding *bornensis* we cannot separate our material which comes from the Malay Peninsula and many of the neighbouring small islands, Sumatra, the Mentawi Islands, Java, Borneo, the Anamba Islands and the Natuna Islands.

This species occurs in Palawan as *paraguae*: it is also known from Sibutu as "*malaccensis*" but no doubt birds from the latter island are *bornensis* as Sharpe has definitely stated that they are not *chlorigaster*.

A. cagayanensis may be a form of this species, or of *A. rhodolaema*.

200. **Anthreptes rhodolaema** Shelley.

7 ♂, 1 ♀ Rayoh.

"Iris red; bill black; feet olive."

Males.—T. L. 138, 135, 140, 130, 132, 130, 140; W. 71, 68, 67, 66, 68, 70, 71; T. 50, 47, 50, 46, 44, 47, 50; B. f. g. 18, 19, 20, 19, 20, 20, 20 mm.

Female.—T. L. 123; W. 65; T. 42; B. f. g. 17 mm.

The female has the throat tinged with orange and is perhaps wrongly sexed.

We have very few females from the Malay Peninsula and cannot make a close comparison between topotypes and Bornean birds, but Bornean males seem exactly like those from the Malay Peninsula.

The "*A. malaccensis rhodolaema*" of Kuroda in Tori, iv, 1925, p. 2 seems to be *A. m. bornensis* Riley: *rhodolaema* cannot, of course, be considered a form of *malaccensis*.

A. rhodolaema has also been recorded from Palawan where, as in Borneo and the Malay Peninsula, it occurs side by side with a form of *malaccensis*. Riley* has suggested that *chlorigaster* is a *species* including (among others) the forms *rhodolaema, wiglesworthi* and *cagayanensis*: we like this view but without going any further into the question may observe that McGregor records both *wiglesworthi* and *chlorigaster* from Tawi Tawi.

201. Arachnothera longirostra buttikoferi Van Oort.

Arachnothera longirostra büttikoferi Van Oort, Notes Leyd Mus., xxxii, 1910, p. 195 (South Borneo).

20 ♂, 5 ♀ Samawang River, Bettotan, Kudat and Rayoh.

"Iris brown or dark; maxilla black; mandible grey or grey with black edges and tip; feet plumbeous, blackish plumbeous or plumbeous blue."

Males.—T. L. 163, 172, 168, 170, 175, 168, 170, 173, 162, 157, 170, 168, 163, 175, 168, 152, 162, 162, 164, 163; W. 73, 69, 69, 69, 72, 68, 69, 70, 67, 71, 70, 70, 70, 70, 70, 62, 67, 70, 70, 70; T. 45, 54, 45, 45, 47, 45, 45, 45, 42, 45, 46, 45, 45, 48, 46, 40, 45, 45, 45, 46; Ts. —, 17, 17, 17, —, —, —, —, 16.5, —, 18, —, —, —, —, —, —, 17, —, 19; B. f. g. 42, 44, 45, 45, 44, 43, 44, 44, 41, 42, 42, 42, 44, 43, 38, 40, 45, 44, 41 mm.

Females.—T. L. 154, 155, 160, 163, 156; W. 61, 63, 65, 70, 65; T. 40, 45, 42, 45, 42; Ts. 18, 16.5, 19, 19, 16.5; B. f. g. 38, 36, 38, 42, 39 mm.

Birds from Sarawak and North Borneo are brighter yellow below than those from the Malay Peninsula and Sumatra. The extremes of the exposed culmen in the long series before us from North Borneo are 35 - 41.2 mm.

The Palawan form is *dilutior*.

202. Arachnothera affinis everetti (Sharpe).

Arachnoraphis everetti Sharpe, Ibis, 1893, p. 561: (Kina Balu), Whitehead, Ibis, 1894, p. 316.

2 ♂, 1 ♀ Bettotan and Rayoh.

"Iris dark; bill black; feet fleshy brown."

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*Proc. U. S. Nat. Mus., 64, 1924, p. 96

Males.—T. L. 193, 200; W. 86, 91; T. 58, 63; Ts. 21, 20; B. f. g. 41, 41 mm.

Female.—T. L. 175; W. 83; T. 51; Ts. —; B. f. g. 40 mm.

The types of this race came from Kina Balu where Whitehead notes that he met with the species up to 4,000′ on that mountain. It has also been recorded from the Liang Koeboeng range near the head waters of the Kapuas River and the Upper Mahakkam by Büttikofer* and Finsch†; and from Mt. Penrissen in South Sarawak.

A. everetti seems to have a very strange distribution. It is montane or submontane widely distributed but also it replaces *modesta* in the lowlands of certain parts of the island†. When compared with *a. affinis*, *everetti* has the throat and breast more heavily marked and the abdomen whiter and less grey; on the upper parts it is markedly greener and much less golden in colour. Compared with *modesta* of the Malay Peninsula, Sumatra and Sarawak (the Baram River and vicinity of Kuching) it is rather greener above, although not markedly so; on the underparts it is very much more heavily streaked. *A. everetti* is rather larger than either *affinis* or *modesta* and has the bill more robust than the latter bird.

No Philippine form.

203. **Arachnothera chrysogenys chrysogenys** Temm.

2 ♂, 1 ♀ Bettotan and Benoni.

"Iris dark; bill black, edges yellow; feet fleshy brown."

Males.—T. L. 182, 182; W. 90, 86; T. 42, 42; Ts. 20, 19.5; B. f. g. 46, 47 mm.

Female.—W. 80 mm.

There are no colour differences, or differences of wing length in birds of this species from Java, Borneo, the Malay Peninsula and Sumatra, but the bills of Bornean bird, seem to attain a rather greater length—39 mm. from the nostril to tip. They are the only birds which have not been named, but in this genus it would be dangerous to propose a race on such a character.

No representative in Palawan or Sibutu.

204. **Arachnothera robusta robusta** Müll. and Schleg.

2 ♂, 1 ♀ Bettotan.

"Iris dark; bill black; feet black or blackish-olive."

Males.—T. L. 232, 218, W. 90, 81; T. 62, 52; Ts. 18, 19; B. f. g. 58, 60 mm.

Female.—T. L. 218; W. 83; T. 60; Ts. 18; B. f. g. 56 mm.

No Philippine form.

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*Notes Leyd. Mus., xxi, 1900, p. 216.

†Notes Leyd. Mus, xxvi, 1905, p. 79

205. Arachnothera crassirostris (Reichenb.).

1 ♂ Bettotan; 1 juv. Rayoh.

"Iris dark; maxilla black; mandible grey, tip black; feet black."

T. L. 168; W. 76; T. 49; Ts. 18; B. f. g. 36 mm.

The juvenile is not fully grown but it is like the adult in colour.

No Philippine form.

206. Arachnothera flavigaster (Eyton).

Arachnothera eytonii nom. nov. Salvadori, Ucc. Born., 1874, p. 182.

5 ♂, 5 ♀ Bettotan.

"Iris brown; bill black; feet brownish yellow."

Males.—T. L. 203, 222, 208, 205, 213; W. 107, 106, 106, 103, 106; T. 54, 60, 54, 50, 59; Ts. 23, 21, 23, 24, 22; B. f. g. 43, 45, 44, 44, 44 mm.

Females.—T. L. 190, 185, 190, 206, 182; W. 97, 97, 93, 95, 93; T. 48, 46, 48, 45, 44; Ts. 21, 22, 22, 23, 21; B. f. g. 42, 39, 41, 42, 39 mm.

No Philippine form

DICAEIDAE

207. Dicæum cruentatum nigrimentum Salvad.

Dicaeum nigrimentum Salvad. Ucc. Born., 1874, p. 165 (Sarawak).

Dicæum pryeri Sharpe, P. Z. S., 1881, p. 795 (Sandakan).

2 ♂ ad. Kudat; 3 ♂ imm. Balambangan and Banguey Islands.

1 ♀ Kota Belud.

"Iris dark; bill and feet black." (adult).

"Iris dark; maxilla black; gape orange, yellow or pink; mandible black; base fleshy or yellow; feet black or leaden-black." (immature).

Males (adult).—T. L. —, 84; W. 48, 46.5; T. —, 24; Ts. 11.5, 11; B. f. g. 11, 11.5 mm.

Female.—W. 46 mm.

Moulton* states that a long series of birds from Kuching, South Sarawak, included specimens with black chins representing *nigrimentum*, others with black chins and throats representing *pryeri*, and also typical continental birds with buff-white chins and throats.

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*Journ. Straits Branch Roy. Asiat Soc., 67, 1914, p. 172.

Sharpe separated *pryeri* as having the whole throat black, instead of the chin only as in *nigrimentum* from Sarawak, with specimens of which he compared his Sandakan series.

Our Kudat males have the chin and part of the throat black (*pryeri*) and we have both *nigrimentum* and "*cruentatum*" from Brunei and *pryeri* from South Sarawak, a reversal of habitats of the two later proposed forms if they represented geographical races. It is obvious, however, that from Sarawak to North Borneo this flower-pecker is becoming, and has become black-throated, but that this character has not yet attained stability as it has in the Sumatran race (*sumatranum* Cab.) which has nearly the whole of the foreneck black in males. It should be known in the above areas as *nigrimentum*.

The female is not separable from the female of *ignitum* of the Malay Peninsula.

No Philippine form.

208. Dicæum trigonostigma dayakana Chas. and Kloss.

Dicaeum trigonostigma dayakana Chasen and Kloss, Journ. fur ornith., 1929, Band 2, p. 121.

D. c. croceoventre Hartert. Bull. B. O. C. xxxviii, 1918, p. 74.

5 ♂, 3 ♀ Bettotan, Samawang River, Banguey Id. and Balambangan Island.

Adult males (*mainland*).—T. L. 95, 91; W. 50, 51; T. 25, 23; Ts. 14, 13; B. f. g. 13, 12.5 mm.

Immature males (*Balambangan*).—T. L. 90, 92, --; W. 52, 51.5, 49; T. 23, 23, —; Ts. 13, 14, 13.5; B. f. g. 14.5, 12.5, 12.5 mm.

Females (*Banguey* 2, *Balambangan* 1).—T. L. 89, —, 85; W. 48.5, 48, 50; T. 23, —, 23; Ts. 13, 13, 13; B. f. g. 13, 13, 13 mm.

(*The first measurements given are those of the type*).

Our adult males, together with some from Sarawak, are darker on the throat than topotypes, although these latter are variable. Hartert wrote "There is a striking difference between Bornean and Malay Peninsular males, the former having the throat much darker ashy grey." He thought the only two Sumatran males he had were as dark-throated as Bornean birds and therefore called the latter *D. t. croceoventre* Vigors (Sumatra). But he noted that "it is not often the case that Sumatran and Bornean birds are alike when the Malayan one differs. More Sumatran birds should be compared". Sumatran birds are not separable from typical *trigonostigma*.*

**Vide* Robinson and Kloss, Journ. Straits Branch Roy. Asiat. Soc., No. 81, 1920, p. 115; id., Journ. Federated Malay States Museums, xi, 1924, p. 336.

The Bornean bird merits a name which we have provided above.

Type.—Adult male from Bettotan near Sandakan, British North Borneo collected on 20th August, 1927.

D. sibutuense of Sibutu is a representative form of this species which does not occur in Palawan.

209. Prionochilus xanthopygius xanthopygius Salvad.

11 ♂ ad., 1 ♂ imm., 5 ♀ Samawang River and Rayoh.

"Iris dark; bill black, base of mandible plumbeous; feet black or plumbeous black."

Males (adult).—T. L. 97, 93, 96, 95, 94, 100, 96, 92, 95, 95, 98; W. 55, 52, 55, 56, 52, 58, 55, 57, 52, 55; T. 26, 28, 27, 26, 30, 26, 33, 28, 26, 27, 30; Ts. 14; B. f. g. 11, 11, 13, 12, 12, 12, 11, 12, 12, 12, 11 mm.

Females.—T. L. 92, 93, 91, 102, 91; W. 50, 52, 55, 51, 52; T. 24, 25, 26, 27, 24; Ts. 14; B. f. g. 11.5, 12, 12, 11, 11 mm.

Robinson* remarks that Bornean records of the very closely allied *P. percussus ignicapillus* are "more than dubious" but it is difficult to expunge the name from the list of Borneo birds in the face of Büttikofer's definite recognition of the two species at the headwaters of the Kapuas River†. Hartert‡ has also recorded males of both species from Bungurun in the North Natuna Islands.

The male of *P. percussus* is distinguished by its white malar stripe, that of *P. xanthopygius* by its yellow rump: females of the former are uniformly green above while those of *xanthopygius* have a yellow rump and tend to develop a blue- grey head.

In Palawan occurs *P. johannae*: it has the yellow rump of *xanthopygius* and the white malar stripe of *percussus*!

210. Prionochilus maculatus maculatus (Temminck).

2 ♂, 2 ♀ Bettotan and Rayoh.

"Iris red; bill black; feet blackish."

Males.—T. L. 92, 92; W. 50, 53; T. 27, 28; Ts. 14, 15; B. f. g. 12, 13 mm.

Females.—T. L. 95, 95; W. 56, 55; T. 28, 27; Ts. 16, 16; B. f. g. 12, 15 mm.

No Philippine representative.

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*"Birds of the Malay Peninsula" 1, 1927, p 311.

†Notes Leyd. Mus., xxi, 1900, pp. 209 and 210.

‡Nov. Zool., i, 1894, p. 474 et ii, 1895, p. 468.

CHALCOPARIIDAE

211. **Chalcoparia singalensis borneana** Kloss.

8 ♂ ad., 4 ♂ imm., 3 ♀ ad., 3 ♀ imm. Samawang River, Bettotan and Rayoh; 1 ♀ Banguey Island.

"Iris crimson; bill black; feet olive."

Adult males.—T. L. 112, 115, 112, 112, 112, 112, 112, 112; W. 52, 55, 54, 53, 53, 55, 54, 53; T. 41, 45, 42, 40, 41, 45, 41, 42; Ts. 16, 15, 15, 16.5, 17, 16, 17, 15.5; B. f. g. 15, 15, 16, 14.5, 16, 15.5, 15, 15.5 mm.

Adult females.—T. L. 104, 105, 106, 106; W. 53, 52, 52, 53; T. 39, 38, 36, 39; Ts. 15, 17, 18, 17; B. f. g. 14, 14, 14, 15 mm.

(*The measurements of the Banguey bird are given last.*)

Kloss has described the Sarawak form of this bird as *borneana** the male of which has the rufous of the foreneck and upper breast rather deeper than in *interposita* Rob. and Kl., and *singalensis* (Gm.) of the Malay Peninsula. This series of North Bornean males has, as a whole, rather more deeply coloured forenecks and breasts than a Malayan one.

The only bird secured on Banguey was a female and it seems exactly like females from the mainland.

Chalcoparia is not known from the Philippines.

*Journ. Fed. Malay States Mus., x, 1921, p 209.

A List of the Birds of Banguey, Balambangan and Mallewalle Islands, British North Borneo

By F. N. CHASEN *and* C. BODEN KLOSS.

The dates 1885, 1889 and 1894 indicate records included in the papers by Guillemard, Everett and Sharpe published in those years. (*vide* p. 4).

Visual records made by us in 1927 are indicated by a cross: "1927" means that specimens were collected on the islands by us in that year.

There is nothing remarkable in the avifauna which, as might be expected from the geographical situation (*vide* p. 2) is essentially that of the lowlands of North Borneo.

Only two species, the megapode and *Ptilinopus melanospila*, are found which are not known from the mainland of Borneo.

In two species, *Treron curvirostra* and *Ducula aenea*, the island forms, if not those inhabiting Balabac and Palawan, are nearer to them than to the Bornean race. But these races of *Treron* and *Ducula* are very near to the forms inhabiting Borneo.

Chalcites xanthorhynchus bangueyensis, *Rhinomyias olivacea perolivacea* and *Pycnonotus plumosus insularis* are based on specimens from Balambangan and Banguey, but none of these can yet be regarded as peculiar to the islands.

Aplonis panayensis heterochlorus is a thin race based on large average size and robust bill, characters shown by the species on other islands in Malaysia.

Meiglyptes tukki pulonis, *Mixornis gularis argentea* and *Dissemurus paradiseus banguey* seem to be confined to the islands.

It can be said that the avifauna of the group is almost entirely Bornean. It shows, however, a slight tendency to internal differentiation and there is a small non-Bornean element, derived from the adjacent Philippine Islands. But this last is not a non-Malaysian factor because Balabac, Palawan and Cagayan Sulu, although politically Philippine, are faunistically part of a province of the Malaysian sub-region.

Dr. F. H. H. Guillemard seems to have been the first naturalist to collect on any of the islands.* In 1883 the Yacht "Marchesa" visited Banguey chiefly for the purpose of watering and a few birds were obtained and recorded as:—

Dissemurus brachyphorus (= *D. paradiseus banguey*).
Aethopyga siparaja
Cittocincla stricklandi
Chalcophaps indica.

A. H. Everett landed on Banguey in 1886† and collected several birds recorded by him in 1889‡: all were additions to Guillemard's short list:—

Copsychus amœnus (= *C. saularis niger*).
Chloropsis cyanopogon
Carpophaga ænea (= *Ducula a. palawanensis*).
Treron nasica (= *T. curvirostra erimacra*).
Ptilopus melanocephalus (= *Ptilinopus melanospila bangueyensis*).

But either Everett or his collectors must have visited the island again—a very likely proceeding for Everett was a Government official in North Borneo and at one time lived in Kudat. Unfortunately no account of his Banguey collections has ever been published and to bring together the scattered references would be a long task.

A skin of *Copsychus* in the British Museum from Banguey is labelled Feb. 1887; and in 1894§ Sharpe recorded a species (*Motacilla ocularis*) from the island, not mentioned in Everett's list of 1889.

Neither Balambangan nor Mallewallé seem to have been collected on previously, although at least one early visitor to Balambangan appears to have had the instincts of a naturalist.¶

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*F. H. H. Guillemard, "Cruise of the 'Marchesa' to Kamschatka and New Guinea", 1886, Vol. II, p. 106 and Proc. Zool. Soc. Lond., 1885, p. 106.

†Ibis, 1886, p. 525.

‡Journ. Straits Branch Roy. Asiat. Soc., No. 20, 1889, pp. 91—212 and map.

§Ibis, 1894, p. 540.

¶"Report made to the Chief and Council of Balambangan, by Lieut. James Barton, of his several surveys," in A. Dalrymple's "Oriental Repertory" Vol. II, pp. 9—32.

—	Banguey	Balambangan	Mallewallé
1. Megapodius nicobariensis cumingi	1927	1927	+*
2. Treron curvirostra erimacra ...	1889	1927	
3. Treron fulvicollis baramensis ...	1927	1927	
4. Treron vernans griseicapilla ...	1927	1927	
5. Ptilinopus melanospila bangueyensis	1889	1927	
6. Ducula aenea palawanensis ...	1889	+	+
7. Streptopelia chinensis tigrina ...	1927	+	
8. Chalcophaps indica indica ...	1885	+	+
9. Charadrius apricarius fulvus ...		1927	
10. Charadrius leschenaulti ...		1927	
11. Charadrius mongolus mongolus	1927	1927	
12. Charadrius alexandrinus peroni ...		1927	
13. Numenius phæopus variegatus ...		1927	
14. Tringa totanus subsp. ...		+	
15. Tringa hypoleucos	+	1927	+
16. Burhinus neglectus		+	
17. Ardea sumatrana sumatrana ...	1927	+	
18. Demiegretta sacra sacra ...	1927	1927	
19. Fregata ariel ariel		1927	+
20. Cuncuma leucogaster leucogaster	+	1927	
21. Haliastur indus intermedius ...	+	+	
22. Coryllis galgulus galgulus ...	1927		
23. Batrachostomus affinis ..	1927		
24. Eurystomus orientalis orientalis ...	1927		
25. Eurystomus orientalis calonyx ...		1927	
26. Ramphacyon capensis subsp. ...	+	+	
27. Ceyx erithacus motleyi ...	1927		
28. Halcyon chloris cyanescens ..	1927	+	
29. Caprimulgus macrurus macrurus	1927	+	
30. Hirundapus leucopygialis ..	+		
31. Collocalia sp.	+	+	
32. Hemiprocne longipennis harterti	1927	1927	
33. Chalcites xanthorhynchus bangueyensis	1927		
34. Rhinortha chlorophæa chlorophæa	1927		
35. Phoenicophaus curvirostris borneensis	1927		
36. Dryobates moluccensis moluccensis		1927	
37. Meiglyptes tristis micropterus ...	1927		
38. Meiglyptes tukki pulonis ...	1927		

*One of our collectors said he saw Megapodes on Mallewallé.

—	Banguey	Balambangan	Mallewallé
39. Dryocopus javensis javensis ...	1927		
40. Hirundo rustica gutturalis ...	+	+	
41. Hirundo javanica abbotti ...		+	
42. Cyornis rufigastra rufigastra ...	1927	1927	1927
43. Muscitrea grisola subsp. ...	1927	1927	+
44. Hypothymis azurea prophata ...	1927	1927	
45. Rhipidura javanica longicauda ...	1927	1927	+
46. Rhinomyias olivacea perolivacea	1927	1927	
47. Coracina sumatrensis sumatrensis	1927		
48. Lalage nigra schisticeps ...	1927	1927	
49. Aegithina viridissima viridissima	1927		
50. Aegithina tiphia viridis . .	1927	1927	
51. Chloropsis cyanopogon cyanopogon	1889		
52. Iole olivacea charlottæ ...	1927		
53. Pycnonotus plumosus insularis ...	1927	1927	1927
54. Pycnonotus brunneus brunneus ...	1927		
55. Pycnonotus simplex perplexus ...		1927	
56. Pellorneum capistratum morrelli	1927		
57. Aethostoma rostrata macroptera	1927		
58. Cyanoderma erythroptera bicolor	1927		
59. Mixornis gularis argentea ..	1927		1927
60. Copsychus saularis niger ..	1889	1927	1927
61. Kittacincla stricklandi stricklandi	1885	1927	+
62. Orthotomus ruficeps sericeus ...	1927	1927	
63. Orthotomus sepium borneoensis	1927	1927	
64. Phylloscopus borealis . .	1927		
65. Hemipus hirundinaceus . .	1927		
66. Dissemurus paradiseus banguey ...	1885	1927	
67. Oriolus xanthonotus consobrinus	1927		1927
68. Artamus leucoryn leucoryn ...	1927	1927	
69. Aplonis panayensis heterochlorus	1927	1927	+
70. Munia fuscans	1927		
71. Motacilla "ocularis" . .	1894*		
72. Aethopyga siparaja siparaja ...	1885		
73. Leptocoma jugularis ornata ...	+	1927	
74. Anthreptes malaccensis bornensis	1927	1927	1927
75. Dicaeum cruentatum nigrimentum	1927	1927	
76. Dicaeum trigonostigma dayakana	1927	1927	
77. Chalcoparia singalensis borneana	1927		

*Moulton does not include *ocularis* in his List of Bornean birds (Journ. Straits Branch, Roy. Asiat. Soc., No 67, 1914, pp. 126—191) although it has been recorded from Baram by A. H. Everett (Ibis, 1890, p. 465). Moulton's "*M. lugens*" (tom. cit. p. 174) requires re-examination.

The Birds of Mangalum and Mantanani Islands off the West Coast of British North Borneo

By C. BODEN KLOSS

The islet of Mangalum lies just outside the 25-fathom contour line and about thirty miles W. N. W. from Jesselton. Nearly circular in shape and about a mile and a half in diameter it is very low and flat except in the centre where there are a few hillocks surrounded by swamp in which sago-palms grow. Except for a little grass-land above some of the beaches it is covered with forest in which a few clearings on the west coast have been made by recent settlers from Borneo and elsewhere by a prospecting company which sank shafts in a search for oil. It is surrounded by coral: the reef is narrowest on the south and southeast, where a close approach is afforded to vessels, but is about a mile wide on the northern side.

The best landing place in the South-west monsoon is above the South-east point: in the winter monsoon the south shore seems most easily accessible.

Numerous little streams of brown but drinkable water reach the sea from the central swamp.

About sixty miles north-east from Mangalum Island but only about fifteen from the coast of Borneo and situated in shallower water lies a little group of islets—the Mantanani Islands—having about the same total area as Mangalum. Their surfaces are more diversified as there is a proportion of grass land on the largest, while others are rocky and provide caves occupied by a "birds-nest" Swift. Bajaus, or Sea-gypsies, inhabit the main islet intermittently and have cultivated suitable spots in a crude manner.

The group has been visited by collectors on several occasions: A. H. Everett, in December 1887, and again in April 1892, was probably the first to obtain birds; Dr. J. C. Moulton was ashore there in June 1921 and the writer spent a few hours on the main islet in June 1924.

I have listed, so far as is known, the birds which have been obtained on the Mantanani group where several species occur which do not seem to be present on Mangalum Island. It is unlikely during the week spent on the latter by myself and three collectors in July 1928 that we missed any resident birds, but though the Mantanani Islands have been less systematically worked they possess the larger fauna.

The only Mangalum birds not secured on the Mantanani Islands were: —

Chalcophaps indica indica
Leptocoma jugularis ornata

While the Mantanani birds not obtained on Mangalum were:—

Columba griseogularis
Caloenas nicobarica
Otus scops mantananensis
Tanygnathus lucionensis
Halcyon chloris cyanescens
Collocalia sp.
Artamus leucoryn leucoryn
Aplonis panayensis heterochlorus

1. MANGALUM ISLAND

1. Megapodius nicobariensis cumingi Dillwyn.

Megapodius Cumingii Dillwyn. P. Z. S. 1851, p. 118, pl. 39 (Labuan Id.).

Motley and Dillwyn. Contr. Nat. Hist. Labuan, 1855, p. 32, pl. 7.

Megapodius lowii Sharpe, P. Z. S., 1875, p. 111 (Labuan).

2 ♂, 3 ♀. 10 - 15 July, 1928.

"Iris brown, skin of head and neck pinkish scarlet; bill horny brown, or olive brown with ochraceous tip, feet blackish, tarsi dull red posteriorly, sometime olive anteriorly."

Total length ♂ 355, 360; ♀ 348, 360, 360: tail ♂ 75, 75; ♀ 68, 77, 75: wing ♂ 212, 210; ♀ 202, 208, 215: tarsus ♂ 60, 60; ♀ — 61, —: bill from gape ♂ 28, 27; ♀ 26, 27, 28 mm.

These birds in fresh plumage are darker throughout than a small series in worn plumage from the Mantanani Islands, a little group sixty miles to the north-east, and one should hesitate to base distinctions on slight colour differences without consideration of the time elapsed since the last moult took place. There is nothing in the description of *M. c. tolutilis* Bangs and Peters,* from Maratua Id. E. Borneo, to show that it differs in any way from other Bornean megapodes.

In spite of what Tweeddale† and Sharpe‡ have written *M. cumingi* is still thought by some authors to be based on Philippine birds, but the first name given to any of them is *M. pusillus* Tweedd.§

I have placed *cumingi* as a subspecies of *nicobariensis* but it is probable that both are only races of *reinwardt* Dumont, 1823.

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*Occ. Papers, Boston Soc. N. H., 5, 1927, p. 235.

†P. Z. S. 1877, p. 765—6 and footnote.

‡P. Z. S. 1879, p. 349.

§loc. cit. supra., pl. lxxviii.

2. **Ducula pickeringi** (Cassin).

Carpophaga pickeringi Cassin, Proc. Acad. Nat. Sci. Philadelphia, vii, 1854, p. 228 (Mangsi Islet).

Carpophaga everetti Grant, Ann. and Mag. N. H. (6) 11, 1888, p. 351 (Mantanani Islands).

7 ♂ 6 ♀. 10 - 15 July 1928.

"Iris and eyelid crimson, bill plumbeous, cere and base darker, feet livid crimson."

Total length ♂ 435, 435, 430, 430, 422, 420, 415; ♀ 435, 435, 420, 410, 405: tail ♂ 172, 167, 175, 175, 170, 167, 170; ♀ 162, 165, 167, 165, 157, 153: wing ♂ 247, 245, 236, 240, 247, 233, 242; ♀ 238, 237, 236, 225, 215, 225 mm.

All except one specimen differ from two topotypes of "*everetti*" in having the tail metallic green instead of blue or violet: but Grant's Mantanani bird has "tail with a dark green metallic lustre" and Guillemard (P. Z. S. 1885, p. 420) notes of a series from Cagayan Sulu Id., "there is but little individual variation in the series, but in some the iridescent colour of the tail inclines rather to blue than green". Of one or two of my specimens which evidently struck me as being, in the flesh, rather more brightly coloured than others I have noted "forehead, cheeks and breasts slightly pinkish" It is evident that colour varies a little: for instance, the under tail-coverts vary from grey to greyish-cinnamon.

This greyish, dull fruit pigeon, almost devoid of metallic sheen and coppery green tints on back and wings, occurs on a number of small islands around North Borneo:—Mangalum,* Mantanani, Mangsi, Cagayan Sulu, Cagayancillo, Sibutu, Sulu: and also in the Talaut Islands north of the Menado Peninsula, Celebes.† The type locality, Mangsi Islet, is only eight miles north of Banguey Island where, in 1928, Mr. F. N. Chasen and I obtained *D. aenea*.

D. pickeringi is, of course, not a full species, but I am unable to say how it should be indicated trinomially.

This grey fruit pigeon was very common on Mangalum.

3. **Myristicivora bicolor bicolor** (Scop.).

1 ♂, 1 ♀. 11 - 12 July, 1928.

"Iris dark; edge of eyelid plumbeous; bill and feet plumbeous tip and claws black".

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*Recorded as occurring on "Mergalun" in Cat. Birds Brit. Mus. xxi, but no specimens listed. Probably observed by A. H. Everett.

†Fide Meyer and Wiglesworth; but Mathews (1927) does not admit its occurrence in the Austro-Oriental subregion.

Total length ♂ 400; ♀ 400: tail ♂ 135; ♀ 140: wing ♂ 233; ♀ 233 mm.

Not numerous on Mangalum Island.

4. Treron vernans griseicapilla Schleg.

One bird was seen.

5. Chalcophaps indica indica (Linn.).

2 , 14th July, 1928.

"Iris dark; eyelid dull crimson; bill scarlet, cere and gonys dull crimson; feet dull crimson."

Total length 252, 245: tail 95, 92: wing 145, 144 mm.

6. Cuncuma leucogaster leucogaster (Gm.).

Several sea-eagles inhabited the island.

7. Leptocoma jugularis ornata (Less.).

3 ♂, 2 ♀. 10 - 14 July, 1928.

"Iris dark, bill and feet black.".

Total length ♂ 115, 113, 110; ♀ 105, 104: Tail ♂ 35, 35, 33; ♀ 30, 30: Wing ♂ 52.5, 52, 52; ♀ 50, 50: Tarsi ♂ 16, 14, 14, ♀ 15, 14: Bill from gape ♂ 20, 19, 19; ♀ 20, 19 mm.

Inseparable from birds from North Borneo, Sumatra and from islands south of Singapore: though the males have the metallic forehead of smaller area than in a series of topotypes this may be due to immaturity and the make-up of the skins: otherwise there are no differences between them and Javanese birds.

8. Anthreptes malaccensis bornensis Riley.

2 ♂, 1 ♂ subad, 5 ♀, 10 - 14 July, 1928.

"Iris red in males, red or dark in females: bill blackish; feet olive, soles ochraceous."

Total length ♂ 140, 136, 133 (subad.); ♀ 128, 126, 114, 133, 123 (imm.): tail 52, 50, 45 (subad.); ♀ 43, 44, 42, 45, 38 (imm.): wings ♂ 70, 67, 65 (subad.); ♀ 62, 66, 63, 67, 61 (imm.): tarsi ♂ 19, 18, 18 (subad.); ♀ —, 19, 17.5, 17, 17 (imm.): bill from gape ♂ 19, 19, 19 (subad.): ♀ 19, 19, 19, 19, 18 (imm.) mm.

Inseparable from a North Bornean series (Jesselton to Sandakan).

The subadult male has yellow moustachial stripes bordering the brown throat and a few yellow feathers above the eye and behind the ear-coverts.

(In addition to the above, Frigate birds were several times observed high above the island while a small plover and a wagtail were seen to alight on the beaches.)

2. MANTANANI ISLANDS

1. **Megapodius nicobariensis cumingi** Dillwyn.

3 ♀. 16th June, 1924.

Wings 213, 215, 218 mm.

"Iris dark; bill horny, tip dull yellow; skin of head carmine; feet black, tarsi dull crimson posteriorly" C. B. K.

Plumage very worn and so faded that the feathers of the nape and mantle have acquired buffy edges.

2. **Ducula pickeringi** Cassin.

1 ♂, 1 ♀, 18th June, 1921.

Wings ♂ 244, ♀ 236 mm.

3. **Myristicivora bicolor bicolor** (Scop.).

1 ♀, 18th June, 1921.

Wing 234 mm.

The nutmeg pigeon occurs in great numbers.

4. **Treron vernans griseicapilla** Schleg.

1 ♀, 16th June, 1924.

Wing 142 mm.

5. **Columba griseogularis** (Walden and Layard).

2 ♂, 18th June, 1921.

1 ♂, 1 ♀, 16th June, 1924.

Wings ♂ 231, 238, 241, ♀ 245 mm.

"Iris orange-yellow; orbital skin crimson; bill tip yellow, base crimson; feet livid crimson" C. B. K.

A Philippine and Sulu Islands bird ranging to North Borneo. Probably a race of *C. metallica* Temm.

6. **Caloenàs nicobarica nicobarica** (Linn.).

1 ♂, 16th June, 1924.

Wing 257 mm.

7. Otus scops mantananensis (Sharpe).

Scops mantananensis Sharpe Bull. B. O. C., 1, 1892, p. iv.

Obtained by A. H. Everett and differentiated by Sharpe from *O. s. elegans* (Cassin) of the Riu-Kiu (Loo-Choo) Islands. Not met with by later collectors.

Related to the better-known *O. s. malayensis* (Hay) of the Malay Peninsula, no representative of which is known from the Bornean mainland though allied races occur in various Philippine and Sulu Islands.

8. Tanygnathus lucionensis (Linn.).

Tanygnathus salvadorii Ogilvie-Grant, Ibis, 1896, p. 562.

1 ♀, 18th June, 1921.

2 ♂, 3 ♀, 16th June, 1924.

Wings ♂ 195, 200; ♀ 191, 192, 193, 195 mm.

"Iris yellow; maxilla scarlet, tip yellowish; mandible reddish-yellow; feet olive" C. B. K.

This series, composed of adult and somewhat immature examples, appears to agree well with descriptions of Philippine birds by McGregor (Manual of Philippine Birds, 1909, p. 281, etc.). The Mantanani birds separated by Grant are obviously immature as Salvadori considered (Cat. Birds Brit. Mus. xx, p. 426). The present series includes both birds with black shoulders and others in which the shoulders are largely green, while the wing-coverts of the latter lack the dark centres of the adults and have the golden margins narrower · further the crowns are of a paler blue.

There is another point: it should not be concluded that *Tanygnathus* is indigenous and that the Mantanani Islands have any special affinity with the Philippines because of its presence. Parrots are popular cage-birds everywhere: the Mantanani group is visited almost yearly by sailing craft from the Sulu Islands, etc., the crews of which may very possibly have introduced the ancestors of the present parrot population.

McGregor states "the Philippine green parrot is the common cage-bird of the natives, who have doubtless aided in its dispersal Escaped cage-birds were shot by us on several occasions".

The species is not found free in Borneo though it occurs on Sibutu and Cagayan Sulu Islands, and on Palawan. Several subspecies have been proposed.

9. Halcyon chloris cyanescens (Oberh.).

1 ♂, 18th June, 1921.

Wing 114 mm.

10. Collocalia sp.

Breeds on the smaller rocky islets of the group.

11. Artamus leucoryn leucoryn (Linn.).

1 ♂, 2 ♀, 15th, 16th June, 1924.

Wings ♂ 135; ♀ 138, 140 mm.

12. Aplonis panayensis heterochlorus (Oberh.).

1 ♂, 16th June, 1924.

Wing 107 mm.

Of the size of the typical form, but plumage similar to birds of the Anamba Islands which Oberholser states differ in colour from Philippine birds.

13. Anthreptes malaccensis bornensis Riley.

1 ♂, 18th June, 1921.

Wing 68 mm.

Additions to the List of Bornean Birds

By F. N. CHASEN *and* C. BODEN KLOSS.

Pseudibis papillosus davisoni (Hume).

The late Mr. H. C. Robinson left the following note "It is interesting to record that Mr. G. C. Shortridge obtained an example of *Inocotis davisoni* at Poeroek Tjahoe, Netherlands. Central Borneo, on 8th September, 1909. Unfortunately he only preserved the head, accompanied by a careful coloured sketch showing the bare parts." *Pseudibis papillosus* (Temm.) has been recorded from Borneo and probably incorrectly, for we think all Malaysian birds are likely to be *davisoni* which seems to be merely the eastern representative of *papillosus.*

Egretta eulophotes (Swinh.).

This species must be definitely added to the list of Bornean birds. Sharpe (Cat. Birds xxvi, p. 142) mentions a specimen from Labuan under *Demiegretta sacra* and we have recently examined some skins of it in the Kuching Museum from various places in Sarawak.

Geocichla sibirica (Pall.).

We have recently seen a skin of *Geocichla sibirica* (Pall.) collected at the foot of Mt. Matang in Sarawak by a native collector employed by Mr. E. Banks of the Sarawak Museum. This species does not seem to have been previously recorded from Borneo although it is known from the Malay Peninsula, Sumatra and Java. Unfortunately the skin is that of an immature male and its racial determination is therefore not absolutely certain but it appears to belong to the typical race rather than to *davisoni* (Hume).

Wing 120 mm.

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